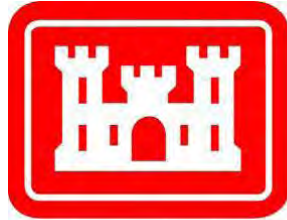


AIRBORNE LIDAR GROUND CONTROL
SURVEY REPORT



**US Army Corps
of Engineers®**

JACKSON, MARSHALL, AND DEKALB COUNTIES, AL
US ARMY CORPS OF ENGINEERS–MOBILE, ALABAMA

Woolpert Project Number: 71899
May 2012





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SECTION 1: SURVEY REPORT

INTRODUCTION

Report Date: May 2012

Project Name: Airborne LiDAR Survey, Jackson, Marshall and DeKalb Counties, AL

Client Information: US Army Corps of Engineers, Mobile District
P.O. Box 2288
Mobile, Alabama 36628-0001
Phone: 251.441.5665

Contract Number: W91278-10-D-0101
Requisition/Reference Number: W31XNJ12719359/C-11-29

Date of Contract: 30 Sept. 2011
Delivery Date: 01 Sept. 2012

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Woolpert Project Number: 071899

This report contains a comprehensive outline of the LiDAR Ground Control Survey that supported the Airborne LiDAR Survey for Jackson, Marshall, and DeKalb counties, AL. All surveys were performed in such a way as to achieve ground control accuracies that meet or exceed the National Mapping Accuracy Standards.

PROJECT AREA

The project area for this report includes all of Jackson, Marshall and DeKalb counties in Alabama, including a 100' buffer zone outside the outer edge of the county boundaries. The other two counties (Clay and Cleburne) will be a separate task order and will be covered in a separate report.

PURPOSE

The purpose of this survey was to establish three-dimensional coordinates for 23 ground control points (GCPs) and a minimum of 20 quality control points (QCPs) in each of the land cover classifications within the project area.

The GCPs were located on open, bare earth surfaces with a level slope to enable effective assessment of swath-to-swath reproducibility and absolute accuracy. The QCPs were collected uniformly dispersed over the project area in the appropriate land cover categories to verify fundamental, supplemental, and consolidated vertical accuracies throughout the task order AOI.

DATE OF SURVEY

Ground control field operations took place between March 28, 2012, and April 05, 2012

MONUMENTATION

Prior to aerial imagery acquisition, Woolpert field crews performed a field reconnaissance to verify the existence and suitability of pre-selected existing National Geodetic Survey (NGS) control stations. These existing control stations were utilized to ensure that quality x , y , and z coordinate values were computed for each of the newly established photogrammetric control stations. Recovery information sheets for the existing NGS control stations can be found in Section 4 of this report. A control diagram showing the ground control stations used to support this LiDAR mapping project can be found in Section 5 of this report.

ACCURACY

The data collected under this task order shall meet the National Standard for spatial Database Accuracy (NSSDA) standards. The NSSDA standards specify that vertical accuracy be reported at the 95 percent confidence level for data tested by an independent source of higher accuracy.

The overall accuracy of the ground control survey is expressed in terms of standard deviation, at a 95% confidence level, based on the published NGS control monuments that were used throughout the task order AOI. The standard deviation of the ground control survey is 0.045' horizontally and 0.048' vertically at the 95% confidence level.

GPS EQUIPMENT

Woolpert utilized Trimble Navigation dual-frequency GPS receivers with Air Link Communications Raven CDMA cellular modems with service plans provided by Verizon as a base station. Additionally, Woolpert utilized Trimble Navigation R8 series GNSS dual-frequency GPS receivers with Air Link Communications Raven CDMA cellular modems and TSC2 data collectors as rovers for this project.

METHODOLOGY

REAL-TIME KINEMATIC (RTK) GPS

The field crew utilized Real-Time Kinematic (RTK) GPS surveying throughout most of the ground control data collection process. The survey was conducted using a 1-second epoch rate, in a fixed solution RTK mode, with each observation lasting between 60 to 180 seconds. Each station was occupied twice to insure the necessary horizontal and vertical accuracies were being met for this photogrammetric project.

RAPID-STATIC GPS

In addition to the RTK GPS techniques, the project field crew utilized rapid-static (RS) GPS surveying techniques on those check points within areas lacking sufficient cellular coverage for RTK measurements.

GPS DATA ANALYSIS AND PROCESSING

The field crew chief processed all session baselines each day using *Trimble Navigation's* Trimble Business Center (TBC) Version 2.70 baseline processor with the accompanying broadcast ephemeris. Daily processing ensured the integrity of the network as it was constructed, and allowed the field crews to immediately reschedule observations of poor baselines. Once the field work was complete, the processed baselines were then run through a rigorous loop closure analysis. As a result of this analysis, unacceptable GPS vectors were removed and field blunders, if any, were detected and eliminated. Once this process was completed, both unconstrained and constrained adjustments were conducted in order to effectively incorporate the static observation data.

The GPS control and base stations consisted of the following:

Dimension	New and Existing Control Stations
3-D	25 10, 36 36, 36 64, 48 13, and 48 8,
2-D	25 23, 25 46, 36 21, 36 29, 36 47, and 36 48,
Vertical	K 476, Q 120, and X 479

DATUM REFERENCE AND FINAL COORDINATES

New horizontal GPS control within the Project area was based on the Alabama East State Plane Coordinate System, referenced to North American Datum 1983, national re-adjustment of 2007 (NAD83/2007), expressed in US Survey Feet. All vertical control was based on the North American Vertical Datum of 1988 (NAVD88), also expressed in US Survey Feet. The coordinates for the ground control survey can be found in Section 2 of this report.

QUALITY ASSURANCE

Existing NGS published control stations were surveyed to assure that there were no discrepancies in the field observation data. Close examinations of the residuals showed no distortions in orientation or scale.

SECTION 2: GEODETIC /GROUND CONTROL COORDINATE LISTINGS

COORDINATE SYSTEM: GRID

HORIZONTAL DATUM: NAD83 (2007)

VERTICAL DATUM: NAVD88

ZONE: State Plane, Alabama East

GEOID MODEL: GEOID 09

UNITS: US Survey Feet

CONTROL BASE STATIONS

Station Name	Northing (US Ft.)	Easting (US Ft.)	Elevation (US Ft.)	Description
100	1426406.87	470557.39	1052.22	TSM - ADJUSTED
25 10	1410146.836	672573.395	897.439	EE2309
25 23	1394022.319	606197.900	1113.787	AA2951
25 46	1497736.031	722817.391	951.135	AA2974
36 36	1595084.434	648358.001	605.875	AA3012
36 29	1492573.619	649384.672	1440.686	AA3005
36 36	1595084.434	648358.001	605.875	AA3012
36 47	1586114.518	575742.609	1700.911	AA3022
36 48	1556615.938	570822.518	1567.603	AA3023
36 64	1494419.378	529909.307	610.967	AA3039
48 13	1358000.468	543976.345	1060.730	AA3052
48 8	1368085.277	477261.565	659.464	AA3047
ALCN	1332683.27	709019.51	640.47	DM3491 (CORS)
HGIS	1539128.30	429800.13	677.37	DK7412 (CORS)
K 476	1523229.55	575936.07	654.44	EF1323
Q 120	1527835.72	746000.42	832.61	EE0971
X 479	1605870.94	674127.38	623.56	EE1500

NGS CONTROL CHECK POINTS

Station Name	Northing (US Ft.)	Easting (US Ft.)	Elevation (US Ft.)	Description
25 10	12482010.92	2008736.74	897.44	EE2309
25 23	12465128.65	1942566.25	1113.79	AA2951
25 46	12570157.45	2057958.08	951.14	AA2974
36 21	12663989.22	2058129.49	1490.86	AA2997
36 29	12564147.19	1984604.28	1440.69	AA3005
36 36	12666616.10	1982388.52	605.88	AA3012
36 47	12656803.88	1909900.99	1700.91	AA3022
36 48	12627258.55	1905325.51	1567.60	AA3023
36 64	12564611.05	1865148.11	610.97	AA3039

Station Name	Northing	Easting	Elevation	Description
	(US Ft.)	(US Ft.)	(US Ft.)	
48 13	12428405.92	1880779.45	1060.73	AA3052
48 8	12437722.48	1813975.90	659.46	AA3047
K 476	12593943.26	1910824.47	654.44	EF1323
Q 120	12600518.86	2080787.39	832.61	EE0971
X 479	12677699.71	2008024.94	623.56	EE1500

WOOLPERT TSM (TEMPORARY SURVEY MARK) CONTROL

Station Name	Northing	Easting	Elevation	Description
	(US Ft.)	(US Ft.)	(US Ft.)	
200	1495178.20	524752.37	603.46	RTK CHECK POINT
201	1390758.68	606106.98	1120.86	RTK CHECK POINT
202	1494757.47	647909.42	1410.89	RTK CHECK POINT
203	1409837.29	673321.76	860.94	RTK CHECK POINT
210	1560839.69	530394.82	624.93	TOTAL STATION CONTROL
211	1562068.34	530439.39	627.34	TOTAL STATION CONTROL

LIDAR GROUND CONTROL

Station Name	Northing	Easting	Elevation	Description
	(US Ft.)	(US Ft.)	(US Ft.)	
1001	1604098.02	541671.09	671.46	CONCRETE CORNER
1002	1618125.02	692029.97	661.74	PID
1003	1582206.43	726942.84	1382.38	CONCRETE PAD
1004	1476919.52	741418.31	1652.10	COMPACTED GRAVEL
1005	1348226.93	574685.46	1065.58	COMPACTED GRAVEL
1006A	1435195.91	579304.76	1149.88	GRAVEL
1006B	1435051.41	579331.98	1158.58	OLD PAINTED L
1007	1388370.21	433381.87	1082.99	FADED STOP BAR
1008A	1489653.28	523909.75	618.12	SHORT GRASS
1008B	1489663.94	523937.84	618.54	CONCRETE CORNER
1009	1534884.34	618642.47	634.96	CONCRETE CORNER
1010A	1371929.82	676497.31	1141.90	CONCRETE CORNER
1010B	1371906.19	676541.28	1140.14	CONCRETE CORNER
1011A	1505415.50	675304.33	1454.11	CONCRETE CORNER
1011B	1505256.40	674915.87	1456.79	LIGHT ASPHALT
1012A	1465635.13	441492.59	568.59	LIGHT ASPHALT
1012B	1467453.64	439886.81	563.07	DIRT
1012C	1452269.46	442860.32	601.98	PLOWED FIELD
1013	1526721.90	736307.15	877.97	CONCRETE CORNER
1014	1491953.81	555836.87	1323.82	PID
1015	1332358.00	500716.46	916.40	CONCRETE CORNER
1015_B	1333578.28	502553.99	920.57	STOP BAR

QUALITY CONTROL POINTS

Station Name	Northing	Easting	Elevation	Description
	(US Ft.)	(US Ft.)	(US Ft.)	
2000	1345144.61	515555.94	970.88	BARE EARTH/SHORT GRASS
2001	1348837.27	551243.53	1013.01	BARE EARTH/SHORT GRASS
2002	1370978.60	584918.34	1120.14	BARE EARTH/SHORT GRASS
2003	1378981.85	553953.84	989.18	BARE EARTH/GRAVEL
2004	1399447.08	496272.70	640.81	BARE EARTH/GRAVEL
2005	1429815.75	437778.74	914.60	BARE EARTH/SHORT GRASS
2006	1456118.80	529383.61	1215.10	BARE EARTH/SHORT GRASS
2007	1377958.60	605850.98	1129.85	BARE EARTH/DIRT
2008	1367570.24	647525.55	719.06	BARE EARTH/SHORT GRASS
2009	1407838.87	606492.55	1170.50	BARE EARTH/LOW GRASS
2010	1503784.31	639312.29	1405.68	BARE EARTH/SHORT GRASS
2011	1444438.75	628142.08	1272.25	BARE EARTH/SHORT GRASS
2012	1444825.29	627992.97	1269.25	BARE EARTH/SHORT GRASS
2013	1373679.17	671402.47	1222.78	BARE EARTH/SHORT GRASS
2014	1587457.84	685955.07	1523.51	BARE EARTH/GRAVEL
2101	1535984.72	513536.64	603.13	BARE EARTH/SHORT GRASS
2102	1497943.24	581184.55	617.52	BARE EARTH/GRAVEL/GRASS
2103	1512093.09	571579.54	615.76	BARE EARTH/GRAVEL
2104	1558863.28	569833.07	1584.57	BARE EARTH
2105	1587823.34	575990.21	1704.87	BARE EARTH/SHORT GRASS
2106	1579899.26	593394.70	1685.69	BARE EARTH/LOW GRASS
2107	1591816.11	641276.84	633.51	BARE EARTH/LOW GRASS
2108	1618161.09	679969.20	677.88	BARE EARTH
2200	1517629.19	698830.32	1553.30	BARE EARTH/SHORT GRASS
2201	1490165.44	720821.10	999.61	BARE EARTH/SHORT GRASS
2202	1559853.87	727563.47	1614.21	BARE EARTH/SHORT GRASS
3000	1351384.01	558156.59	1040.68	URBAN CONCETE
3001	1403079.84	517605.70	599.61	URBAN CONCETE
3001_90	1403079.79	517605.67	599.68	URBAN CONCETE
3002	1370863.22	541938.71	1053.65	URBAN CONCETE
3003	1442271.49	438510.26	1201.39	URBAN/VERY LIGHT ASPHALT
3004	1391028.44	454127.07	1100.39	URBAN CONCETE
3005	1377861.33	611503.49	1131.64	URBAN CONCETE
3006	1369753.03	647974.96	712.69	URBAN/VERY LIGHT ASPHALT
3007	1495054.49	630237.57	1368.36	URBAN CONCETE
3008	1485690.06	609254.24	1344.78	URBAN CONCETE
3009	1485648.10	609280.10	1345.55	URBAN CONCETE
3010	1454376.60	652804.31	1313.12	URBAN CONCETE
3011	1505702.45	673122.13	1451.77	URBAN CONCETE
3012	1505935.40	675333.83	1457.45	URBAN CONCETE
3013	1443238.57	696723.80	915.19	URBAN CONCETE

Station Name	Northing	Easting	Elevation	Description
	(US Ft.)	(US Ft.)	(US Ft.)	
3101	1489485.33	589281.22	617.50	URBAN CONCETE
3102	1516930.96	593555.33	621.42	URBAN CONCETE
3103	1539652.18	542311.75	1557.14	URBAN CONCETE
3104	1573049.65	572039.89	1662.03	URBAN/CONCRETE
3105	1544947.97	594503.99	630.85	URBAN /CONCRETE
3106	1608426.26	581182.22	1774.50	URBAN/CONC
3107	1596210.13	647680.56	625.54	URBAN
3107B	1561670.86	632969.86	609.92	URBAN
3108	1620831.99	688754.47	666.69	URBAN/CONCRETE
3109	1613566.85	688861.24	705.41	URBAN/CONCRETE
3200	1462570.37	711508.53	970.45	URBAN
3201	1479641.41	735636.04	1675.61	URBAN CONC PAD
4000	1350940.71	585305.27	1088.90	TALL GRASS
4001	1394972.78	575906.85	1096.46	TALL GRASS
4002	1424293.57	462999.65	1041.26	TALL GRASS
4003	1402339.03	434313.33	953.13	TALL GRASS
4004	1489057.92	541876.32	695.54	TALL GRASS
4005	1378471.90	600925.28	1119.40	TALL GRASS
4006	1353353.49	637848.81	786.01	TALL GRASS
4007	1426249.87	575921.89	1143.44	TALL GRASS
4008	1531500.32	670605.58	1474.47	TALL GRASS
4009	1536469.09	651921.98	1432.92	TALL GRASS
4010	1502236.08	618907.63	1414.33	TALL GRASS
4011	1475042.60	623550.14	1273.99	TALL GRASS
4012	1478458.25	666922.55	1390.78	TALL GRASS
4013	1418629.48	716386.37	1291.56	TALL GRASS
4014	1416908.35	666920.94	750.56	TALL GRASS
4015	1578094.02	711597.41	1355.38	TALL GRASS
4017	1562138.36	530212.91	625.81	TALL GRASS
4101	1610019.84	541279.94	682.69	TALL GRASS
4102	1537225.21	569087.30	632.19	TALL GRASS
4103	1566824.06	621869.34	616.17	TALL GRASS
4103	1621345.50	629059.37	629.62	TALL GRASS
4104	1611452.46	672245.63	609.13	TALL GRASS
4200	1476341.77	712373.73	949.90	TALL GRASS
4201	1521289.45	732259.95	890.56	TALL GRASS
4202	1558929.19	689160.59	1356.15	TALL GRASS
5000	1336880.57	520548.43	913.93	BRUSH/TREES
5001	1358904.81	549894.77	1023.43	BRUSH/TREES
5002	1390748.34	533923.24	990.79	BRUSH/TREES
5003	1413685.06	433515.37	752.43	BRUSH/TREES
5004	1413708.80	433518.87	752.35	BRUSH/TREES
5005	1414127.54	433608.50	708.15	BRUSH/TREES

Station Name	Northing	Easting	Elevation	Description
	(US Ft.)	(US Ft.)	(US Ft.)	
5006	1466322.37	527514.60	1203.34	BRUSH/TREES
5007	1466329.22	527528.88	1203.54	BRUSH/TREES
5008	1399051.12	595825.79	1144.79	BRUSH/TREES
5009	1522390.90	643732.73	1366.93	BRUSH/TREES
5010	1522402.05	643724.23	1366.64	BRUSH/TREES
5011	1473043.97	609545.43	1299.02	BRUSH/TREES
5012	1476105.60	618099.78	1287.48	BRUSH/TREES
5013	1472219.64	631595.73	1290.54	BRUSH/TREES
5014	1472237.08	631588.79	1289.04	BRUSH/TREES
5015	1445724.80	667844.69	1265.20	BRUSH/TREES
5016	1402549.29	668749.62	856.26	BRUSH/TREES
5017	1402561.36	668752.69	856.78	BRUSH/TREES
5018	1608624.05	713726.94	1503.90	BRUSH/TREES
5101	1544412.43	510487.56	618.58	BRUSH/TREES
5102	1521859.75	506925.64	595.66	BRUSH/TREES
5103	1523085.64	570179.51	621.77	BRUSH/TREES
5104	1549841.18	597829.13	614.33	BRUSH/TREES
5105	1598197.21	578434.61	1763.42	BRUSH/TREES
5106	1583196.35	591242.34	1693.27	BRUSH/TREES
5107	1600693.06	663177.82	631.31	BRUSH/TREES
5108	1631397.04	663151.87	669.34	BRUSH/TREES
5200	1539493.01	705434.55	1449.59	BRUSH/TREES
5201	1493156.29	700437.47	1486.18	BRUSH/TREES
6000	1561972.13	530496.21	625.60	FOREST ALONG CEEK
6001	1561953.41	530331.00	624.80	FOREST ALONG CEEK
6002	1561935.09	530218.83	624.72	FOREST ALONG CEEK
6003	1561916.74	530148.98	625.54	FOREST ALONG CEEK
6004	1561982.55	530110.99	626.57	FOREST ALONG CEEK
6005	1562109.19	530042.67	626.25	FOREST ALONG CEEK
6006	1397248.30	478209.10	1014.62	FOREST
6007	1397319.39	478196.89	1015.09	FOREST
6008	1397408.04	478189.90	1016.10	FOREST
6009	1397486.73	478170.46	1016.92	FOREST
6010	1397559.93	478158.14	1017.53	FOREST
6011	1397684.26	478127.88	1020.46	FOREST
6012	1423089.78	701317.59	1471.74	FOREST
6013	1423071.55	701238.60	1475.41	FOREST
6014	1423081.54	701101.68	1474.56	FOREST
6015	1423168.29	701088.48	1475.58	FOREST
6016	1423861.06	701730.10	1480.90	FOREST
6017	1423827.68	701786.76	1478.57	FOREST
6100	1594574.21	648244.13	603.49	DENSE FOSEST
6101	1594583.65	648130.97	602.41	DENSE FOSEST

Station Name	Northing	Easting	Elevation	Description
	(US Ft.)	(US Ft.)	(US Ft.)	
6102	1594583.41	648010.62	601.81	DENSE FOSEST
6103	1594593.92	647909.67	601.39	DENSE FOSEST
6104	1594606.62	647822.45	601.49	DENSE FOSEST
6105	1594611.16	647722.82	601.25	DENSE FOSEST

COORDINATE SYSTEM: GEODETIC

HORIZONTAL DATUM: WGS 84
 VERTICAL DATUM: NAVD88
 GEOID MODEL: GEOID 09
 UNITS: US Survey Feet

CONTROL BASE STATIONS

Station Name	Latitude	Longitude	Ellips. Hgt.	Description
			(US Ft.)	
100	N34°25'08.96936"	W86°26'55.55214"	957.44	TSM - ADJUSTED
25 10	N34°22'33.65398"	W85°46'44.25782"	803.078	EE2309
25 23	N34°19'53.78840"	W85°59'55.84299"	1019.061	AA2951
25 46	N34°36'59.40011"	W85°36'42.53090"	856.708	AA2974
36 36	N34°53'03.03802"	W85°51'33.73189"	511.150	AA3012
36 29	N34°36'09.05133"	W85°51'21.13234"	1346.551	AA3005
36 36	N34°53'03.03802"	W85°51'33.73189"	511.150	AA3012
36 47	N34°51'33.26001"	W86°06'05.08342"	1607.106	AA3022
36 48	N34°46'41.34689"	W86°07'03.12102"	1473.540	AA3023
36 64	N34°36'24.71947"	W86°15'10.47843"	516.067	AA3039
48 13	N34°13'55.83046"	W86°12'16.21477"	965.331	AA3052
48 8	N34°15'32.46740"	W86°25'31.47258"	564.488	AA3047
ALCN	N34°09'46.95679"	W85°39'31.02172"	545.55	DM3491 (CORS)
HGIS	N34°43'41.17555"	W86°35'12.06237"	583.10	DK7412 (CORS)
K 476	N34°41'11.24614"	W86°06'00.75734"	559.77	EF1323
Q 120	N34°41'56.54109"	W85°32'04.08294"	737.81	EE0971
X 479	N34°54'49.68727"	W85°46'24.32989"	528.61	EE1500

NGS CONTROL CHECK POINTS

Station Name	Latitude	Longitude	Ellips. Hgt.	Description
			(US Ft.)	
25 10	N34°22'33.65398"	W85°46'44.25782"	803.08	EE2309
25 23	N34°19'53.78840"	W85°59'55.84299"	1019.06	AA2951
25 46	N34°36'59.40011"	W85°36'42.53090"	856.71	AA2974
36 21	N34°52'27.57648"	W85°36'24.91845"	1396.02	AA2997
36 29	N34°36'09.05133"	W85°51'21.13234"	1346.55	AA3005
36 36	N34°53'03.03802"	W85°51'33.73189"	511.15	AA3012
36 47	N34°51'33.26001"	W86°06'05.08342"	1607.11	AA3022
36 48	N34°46'41.34689"	W86°07'03.12102"	1473.54	AA3023
36 64	N34°36'24.71947"	W86°15'10.47843"	516.07	AA3039
48 13	N34°13'55.83046"	W86°12'16.21477"	965.33	AA3052
48 8	N34°15'32.46740"	W86°25'31.47258"	564.49	AA3047
K 476	N34°41'11.24614"	W86°06'00.75734"	559.77	EF1323

Station Name	Latitude	Longitude	Ellips. Hgt.	Description
			(US Ft.)	
Q 120	N34°41'56.54109"	W85°32'04.08294"	737.81	EE0971
X 479	N34°54'49.68727"	W85°46'24.32989"	528.61	EE1500

WOOLPERT TSM (TEMPORARY SURVEY MARK) CONTROL

Station Name	Latitude	Longitude	Ellips. Hgt.	Description
			(US Ft.)	
200	N34°36'32.00883"	W86°16'12.21108"	508.54	RTK DERIVED TSM
201	N34°19'21.50245"	W85°59'56.86365"	1026.12	RTK DERIVED TSM
202	N34°36'30.64985"	W85°51'38.78769"	1316.75	RTK DERIVED TSM
203	N34°22'30.58782"	W85°46'35.33143"	766.59	RTK DERIVED TSM
210	N34°47'21.72553"	W86°15'07.97714"	530.72	RTK DERIVED TSM
211	N34°47'33.88018"	W86°15'07.50413"	533.14	RTK DERIVED TSM

LiDAR GROUND CONTROL

Station Name	Latitude	Longitude	Ellips. Hgt.	Description
			(US Ft.)	
1001	N34°54'30.04423"	W86°12'54.75521"	577.50	CONCRETE CORNER
1002	N34°56'50.73613"	W85°42'49.18195"	566.65	PID
1003	N34°50'54.84395"	W85°35'50.80000"	1287.52	CONCRETE PAD
1004	N34°33'33.02959"	W85°33'00.67370"	1557.80	COMPACTED GRAVEL
1005	N34°33'33.02977"	W85°33'00.67550"	1557.75	COMPACTED GRAVEL
1006A	N34°12'20.10352"	W86°06'10.15789"	970.44	GRAVEL
1006B	N34°26'40.52807"	W86°05'17.75661"	1054.93	OLD PAINTED L
1007	N34°26'39.09931"	W86°05'17.42721"	1063.64	FADED STOP BAR
1008A	N34°18'50.28022"	W86°34'15.97319"	989.04	SHORT GRASS
1008B	N34°35'37.32302"	W86°16'22.00391"	523.16	CONCRETE CORNER
1009	N34°35'37.42971"	W86°16'21.66848"	523.59	CONCRETE CORNER
1010A	N34°43'07.35209"	W85°57'29.52516"	540.36	CONCRETE CORNER
1010B	N34°16'15.58001"	W85°45'57.74516"	1047.33	CONCRETE CORNER
1011A	N34°16'15.34595"	W85°45'57.22142"	1045.57	CONCRETE CORNER
1011B	N34°38'16.02759"	W85°46'10.96112"	1359.98	LIGHT ASPHALT
1012A	N34°38'14.45619"	W85°46'15.61142"	1362.66	LIGHT ASPHALT
1012B	N34°31'35.10204"	W86°32'45.76306"	473.95	DIRT
1012C	N34°31'52.97669"	W86°33'05.10823"	468.44	PLOWED FIELD
1013	N34°29'22.99509"	W86°32'28.29908"	507.44	CONCRETE CORNER
1014	N34°41'45.79313"	W85°34'00.21110"	783.24	PID
1015	N34°36'01.28817"	W86°10'00.20208"	1228.91	CONCRETE CORNER
1015_B	N34°09'40.31445"	W86°20'49.89568"	820.93	STOP BAR

QUALITY CONTROL POINTS

Station Name	Latitude	Longitude	Ellips. Hgt.	Description
			(US Ft.)	
2000	N34°11'47.50511"	W86°17'54.00133"	875.37	BARE EARTH/SHORT GRASS
2001	N34°12'25.43979"	W86°10'49.29054"	917.67	BARE EARTH/SHORT GRASS
2002	N34°16'05.42004"	W86°04'08.94808"	1025.14	BARE EARTH/SHORT GRASS
2003	N34°17'23.72501"	W86°10'18.21313"	893.88	BARE EARTH/GRAVEL
2004	N34°20'43.72876"	W86°21'46.93001"	545.59	BARE EARTH/GRAVEL
2005	N34°25'40.54509"	W86°33'27.08440"	820.32	BARE EARTH/SHORT GRASS
2006	N34°30'05.84477"	W86°15'14.85873"	1120.01	BARE EARTH/SHORT GRASS
2007	N34°17'14.87734"	W85°59'59.66591"	1035.06	BARE EARTH/DIRT
2008	N34°15'32.50816"	W85°51'42.95083"	624.38	BARE EARTH/SHORT GRASS
2009	N34°22'10.46828"	W85°59'52.59658"	1075.81	BARE EARTH/LOW GRASS
2010	N34°37'59.90574"	W85°53'21.70169"	1311.50	BARE EARTH/SHORT GRASS
2011	N34°28'12.78763"	W85°55'34.72541"	1177.86	BARE EARTH/SHORT GRASS
2012	N34°28'16.60990"	W85°55'36.51061"	1174.86	BARE EARTH/SHORT GRASS
2013	N34°16'32.91418"	W85°46'58.44356"	1128.23	BARE EARTH/SHORT GRASS
2014	N34°51'47.46500"	W85°44'02.52362"	1428.72	BARE EARTH/GRAVEL
2101	N34°43'15.13843"	W86°18'28.68989"	508.53	BARE EARTH/SHORT GRASS
2102	N34°37'01.25738"	W86°04'57.15875"	522.68	BARE EARTH/GRAVEL/GRASS
2103	N34°39'20.97207"	W86°06'52.55358"	520.97	BARE EARTH/GRAVEL
2104	N34°47'03.54824"	W86°07'15.05973"	1490.55	BARE EARTH
2105	N34°51'50.16892"	W86°06'02.16693"	1611.07	BARE EARTH/SHORT GRASS
2106	N34°50'32.19880"	W86°02'33.10532"	1591.67	BARE EARTH/LOW GRASS
2107	N34°52'30.68357"	W85°52'58.71170"	538.83	BARE EARTH/LOW GRASS
2108	N34°56'51.21162"	W85°45'14.06487"	582.87	BARE EARTH
2200	N34°40'16.60398"	W85°41'29.19769"	1459.04	BARE EARTH/SHORT GRASS
2201	N34°35'44.55694"	W85°37'06.60910"	905.22	BARE EARTH/SHORT GRASS
2202	N34°47'13.73293"	W85°35'43.98899"	1519.38	BARE EARTH/SHORT GRASS
3000	N34°12'50.85792"	W86°09'27.07632"	945.39	URBAN CONCETE
3001	N34°21'20.69073"	W86°17'32.71161"	504.17	URBAN CONCETE
3001_90	N34°21'20.69022"	W86°17'32.71199"	504.24	URBAN CONCETE
3002	N34°16'02.99624"	W86°12'41.05201"	958.26	URBAN CONCETE
3003	N34°27'43.79931"	W86°33'19.41216"	1107.02	URBAN/VERY LIGHT ASPHALT
3004	N34°19'17.99453"	W86°30'08.87942"	1006.06	URBAN CONCETE
3005	N34°17'14.00155"	W85°58'52.29744"	1036.88	URBAN CONCETE
3006	N34°15'54.10221"	W85°51'37.60340"	618.01	URBAN/VERY LIGHT ASPHALT
3007	N34°36'33.48944"	W85°55'10.21241"	1274.12	URBAN CONCETE
3008	N34°35'00.60989"	W85°59'21.08066"	1250.31	URBAN CONCETE
3009	N34°35'00.19523"	W85°59'20.77068"	1251.07	URBAN CONCETE
3010	N34°29'51.21785"	W85°50'40.17309"	1218.82	URBAN CONCETE
3011	N34°38'18.87886"	W85°46'37.07566"	1357.65	URBAN CONCETE
3012	N34°38'21.17011"	W85°46'10.60415"	1363.32	URBAN CONCETE
3013	N34°28'00.77616"	W85°41'55.60529"	820.95	URBAN CONCETE

Station Name	Latitude	Longitude	Ellips. Hgt.	Description
			(US Ft.)	
3101	N34°35'37.78170"	W86°03'20.06009"	522.72	URBAN CONCETE
3102	N34°40'09.35435"	W86°02'29.61299"	526.71	URBAN CONCETE
3103	N34°43'52.62211"	W86°12'44.14078"	1462.82	URBAN CONCETE
3104	N34°49'23.93186"	W86°06'49.07724"	1568.16	URBAN/CONCRETE
3105	N34°44'46.50466"	W86°02'18.93948"	536.33	URBAN /CONCRETE
3106	N34°55'14.08897"	W86°05'00.47766"	1680.61	URBAN/CONC
3107	N34°53'14.17081"	W85°51'41.86738"	530.82	URBAN
3107B	N34°47'32.45339"	W85°54'38.13556"	515.27	URBAN
3108	N34°57'17.54823"	W85°43'28.49436"	571.60	URBAN/CONCRETE
3109	N34°56'05.68625"	W85°43'27.30684"	610.35	URBAN/CONCRETE
3200	N34°31'11.77440"	W85°38'58.60505"	876.19	URBAN
3201	N34°34'00.10866"	W85°34'09.72463"	1581.31	URBAN CONC PAD
4000	N34°12'47.20876"	W86°04'03.78823"	993.85	TALL GRASS
4001	N34°20'02.55431"	W86°05'57.06973"	1001.44	TALL GRASS
4002	N34°24'47.60266"	W86°28'25.60196"	946.61	TALL GRASS
4003	N34°21'08.51791"	W86°34'06.07435"	859.07	TALL GRASS
4004	N34°35'32.15530"	W86°12'47.07269"	600.62	TALL GRASS
4005	N34°17'19.87129"	W86°00'58.38151"	1024.58	TALL GRASS
4006	N34°13'11.82919"	W85°53'38.13928"	691.20	TALL GRASS
4007	N34°25'11.94837"	W86°05'57.86828"	1048.45	TALL GRASS
4008	N34°42'34.07502"	W85°47'07.04672"	1380.29	TALL GRASS
4009	N34°43'23.25515"	W85°50'50.85241"	1338.58	TALL GRASS
4010	N34°37'44.41103"	W85°57'25.86772"	1319.95	TALL GRASS
4011	N34°33'15.47247"	W85°56'29.96301"	1179.68	TALL GRASS
4012	N34°33'49.41362"	W85°47'51.38814"	1296.60	TALL GRASS
4013	N34°23'57.02247"	W85°38'01.34523"	1197.20	TALL GRASS
4014	N34°23'40.56444"	W85°47'51.66672"	656.17	TALL GRASS
4015	N34°50'14.48513"	W85°38'55.01034"	1260.71	TALL GRASS
4017	N34°47'34.56343"	W86°15'10.22321"	531.61	TALL GRASS
4101	N34°55'28.60233"	W86°12'59.72388"	588.74	TALL GRASS
4102	N34°43'29.49648"	W86°07'23.25268"	537.78	TALL GRASS
4103	N34°48'23.32121"	W85°56'51.30369"	521.56	TALL GRASS
4103	N34°57'22.68147"	W85°55'25.66913"	535.18	TALL GRASS
4104	N34°55'44.90600"	W85°46'46.88977"	514.19	TALL GRASS
4200	N34°33'27.98289"	W85°38'47.96099"	855.57	TALL GRASS
4201	N34°40'52.16121"	W85°34'48.84481"	795.92	TALL GRASS
4202	N34°47'05.24406"	W85°43'24.43079"	1261.76	TALL GRASS
5000	N34°10'25.97737"	W86°16'54.13375"	818.41	BRUSH/TREES
5001	N34°14'04.98410"	W86°11'05.76325"	928.07	BRUSH/TREES
5002	N34°19'19.39517"	W86°14'17.49942"	895.37	BRUSH/TREES
5003	N34°23'00.68793"	W86°34'16.57486"	658.30	BRUSH/TREES
5004	N34°23'00.92299"	W86°34'16.53522"	658.22	BRUSH/TREES
5005	N34°23'05.07133"	W86°34'15.50212"	614.02	BRUSH/TREES

Station Name	Latitude	Longitude	Ellips. Hgt.	Description
			(US Ft.)	
5006	N34°31'46.69727"	W86°15'37.70497"	1108.31	BRUSH/TREES
5007	N34°31'46.76565"	W86°15'37.53460"	1108.50	BRUSH/TREES
5008	N34°20'43.34941"	W86°01'59.64064"	1050.00	BRUSH/TREES
5009	N34°41'03.97709"	W85°52'28.89235"	1272.67	BRUSH/TREES
5010	N34°41'04.08727"	W85°52'28.99419"	1272.37	BRUSH/TREES
5011	N34°32'55.52198"	W85°59'17.36611"	1204.54	BRUSH/TREES
5012	N34°33'25.92478"	W85°57'35.14326"	1193.12	BRUSH/TREES
5013	N34°32'47.62300"	W85°54'53.74285"	1196.27	BRUSH/TREES
5014	N34°32'47.79543"	W85°54'53.82597"	1194.76	BRUSH/TREES
5015	N34°28'25.61435"	W85°47'40.51180"	1170.87	BRUSH/TREES
5016	N34°21'18.51588"	W85°47'29.91494"	761.85	BRUSH/TREES
5017	N34°21'18.63526"	W85°47'29.87835"	762.37	BRUSH/TREES
5018	N34°55'16.42595"	W85°38'28.76105"	1408.94	BRUSH/TREES
5101	N34°44'38.35478"	W86°19'05.70324"	524.03	BRUSH/TREES
5102	N34°40'55.10944"	W86°19'47.05170"	500.88	BRUSH/TREES
5103	N34°41'09.66629"	W86°07'09.68614"	527.12	BRUSH/TREES
5104	N34°45'34.97107"	W86°01'39.20587"	519.84	BRUSH/TREES
5105	N34°53'32.84254"	W86°05'33.15494"	1669.59	BRUSH/TREES
5106	N34°51'04.76603"	W86°02'59.01345"	1599.32	BRUSH/TREES
5107	N34°53'58.51648"	W85°48'35.82545"	536.45	BRUSH/TREES
5108	N34°59'02.21607"	W85°48'36.05100"	574.65	BRUSH/TREES
5200	N34°43'52.77215"	W85°40'09.70054"	1355.22	BRUSH/TREES
5201	N34°36'14.50317"	W85°41'10.38332"	1391.87	BRUSH/TREES
6000	N34°47'32.93088"	W86°15'06.81811"	531.40	FOREST ALONG CEEK
6001	N34°47'32.73891"	W86°15'08.79796"	530.60	FOREST ALONG CEEK
6002	N34°47'32.55308"	W86°15'10.14202"	530.52	FOREST ALONG CEEK
6003	N34°47'32.36865"	W86°15'10.97859"	531.33	FOREST ALONG CEEK
6004	N34°47'33.01803"	W86°15'11.43735"	532.36	FOREST ALONG CEEK
6005	N34°47'34.26786"	W86°15'12.26293"	532.05	FOREST ALONG CEEK
6006	N34°20'20.99450"	W86°25'22.19866"	919.74	FOREST
6007	N34°20'21.69701"	W86°25'22.34915"	920.21	FOREST
6008	N34°20'22.57347"	W86°25'22.43867"	921.23	FOREST
6009	N34°20'23.35081"	W86°25'22.67591"	922.04	FOREST
6010	N34°20'24.07411"	W86°25'22.82792"	922.66	FOREST
6011	N34°20'25.30226"	W86°25'23.19738"	925.59	FOREST
6012	N34°24'41.40060"	W85°41'01.09502"	1377.51	FOREST
6013	N34°24'41.22148"	W85°41'02.03813"	1381.18	FOREST
6014	N34°24'41.32230"	W85°41'03.67219"	1380.32	FOREST
6015	N34°24'42.18061"	W85°41'03.82822"	1381.34	FOREST
6016	N34°24'49.02409"	W85°40'56.15776"	1386.66	FOREST
6017	N34°24'48.69308"	W85°40'55.48206"	1384.34	FOREST
6100	N34°52'57.99093"	W85°51'35.09712"	508.76	DENSE FOSEST
6101	N34°52'58.08404"	W85°51'36.45553"	507.69	DENSE FOSEST

Station Name	Latitude	Longitude	Ellips. Hgt.	Description
			(US Ft.)	
6102	N34°52'58.08134"	W85°51'37.90010"	507.09	DENSE FOSEST
6103	N34°52'58.18504"	W85°51'39.11185"	506.67	DENSE FOSEST
6104	N34°52'58.31036"	W85°51'40.15880"	506.77	DENSE FOSEST
6105	N34°52'58.35499"	W85°51'41.35470"	506.53	DENSE FOSEST

SECTION 3: GEODETIC/ GROUND CONTROL LOGS AND PHOTOS

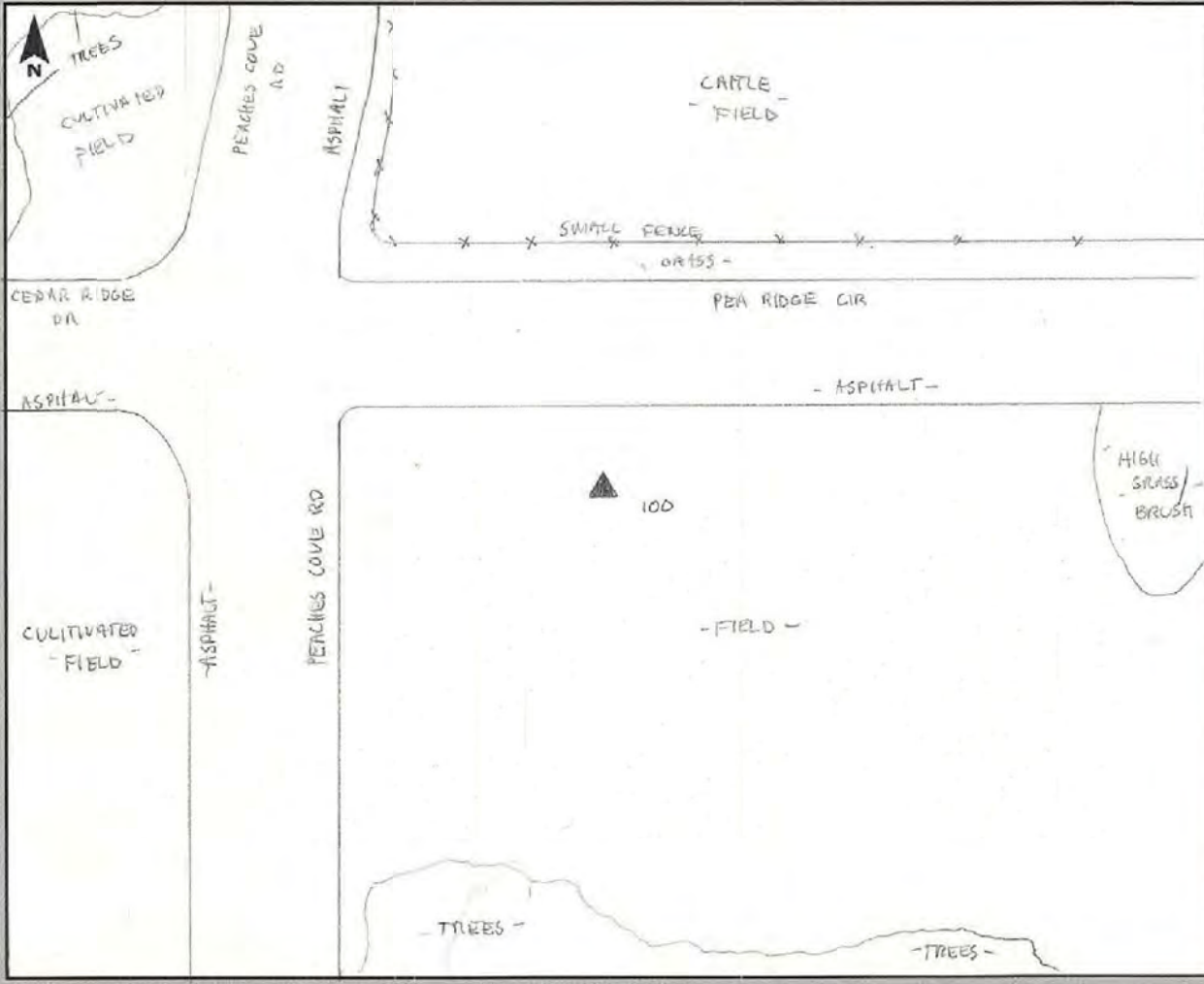
This section contains the station recovery information sheets and photographs for the geodetic control, ground control and checkpoint stations established for the project.

The data is assembled on the following pages.

GPS Observation Log Sheet



Project Name: <u>5 Co AL LDAR</u>	Project Number: <u>71899</u> Survey Date: <u>3/30/2012</u>
Station Name: <u>100</u>	Operator Name: <u>Cody Schneider</u>
Latitude: <u>N34°25'09.01"</u>	Julian Day: <u>90</u> Session No. <u>N/A</u>
Longitude: <u>W86°26'55.58"</u>	Start Time: <u>8:41</u> End Time: <u>15:30</u>
Ellip. Height: <u>295.6m</u>	Data File Name: <u>21130906</u>
Type of Mark: <u>TSM</u>	Type of Receiver: <u>RF-2 #2113</u>
Stamping on Mark: <u>100 SET 2012</u>	Type of Antenna: <u>RF-2 #2113</u>
Weather Condition: <u>Partly Cloudy & 65°</u>	Antenna Height: <u>2.25m</u> to bottom of antenna mount

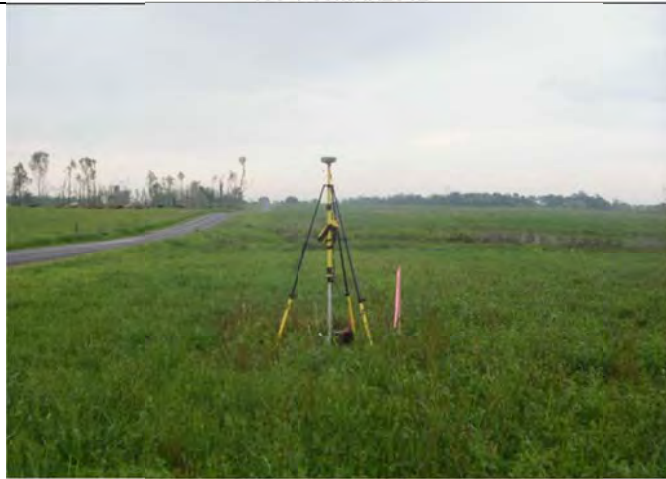




100-1-30MAR2012



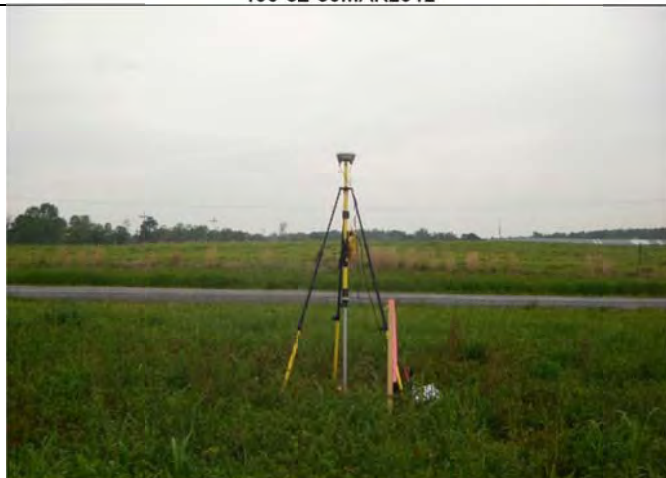
100-2-30MAR2012



100-3E-30MAR2012



100-3W-30MAR2012



100-3N-30MAR2012



100-3S-30MAR2012

GPS Observation Log Sheet



Project Name: <u>Jackson, Marshall and DeKalb Counties, AL</u>	Project Number: <u>71899</u>	Survey Date: <u>3/31/12</u>
Station Name: <u>K 476</u>	Operator Name: <u>Josh Nave</u>	
Latitude: <u>N34-41-11.246</u>	Julian Day: <u>091</u>	Session No. <u>BASE</u>
Longitude: <u>W86-06-00.755</u>	Start Time: <u>8:32 AM</u>	End Time: <u>4:11 PM</u>
Ellip. Height: <u>559.77 FT</u>	Data File Name: <u>K476091A</u>	
Type of Mark: <u>DISK IN BEDROCK</u>	Type of Receiver: <u>Trimble 4000SSI</u>	
Stamping on Mark: <u>K 476 1988</u>	Type of Antenna: <u>Trimble M/C 21/22</u>	
Weather Condition: _____	Antenna Height: <u>6.562 FT</u>	<small>to bottom of antenna mount</small>





K 476-EF1323-1-31MAR2012



K 476-EF1323-3W-31MAR2012



K 476-EF1323-3E-31MAR2012



K 476-EF1323-2-31MAR2012



K 476-EF1323-3N-31MAR2012

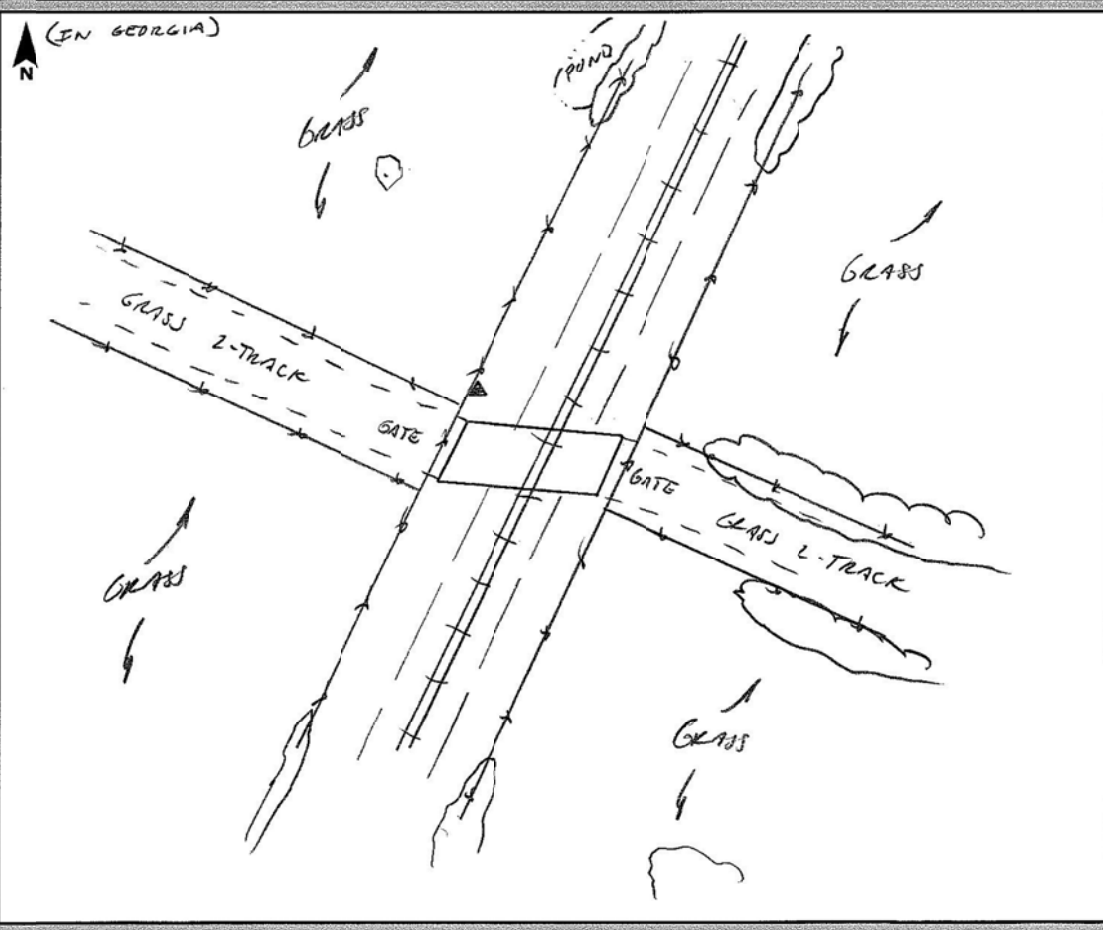


K 476-EF1323-3S-31MAR2012

GPS Observation Log Sheet



Project Name: <u>LIDAR QC ALA - 3 County</u> Station Name: <u>Q120 (EE0921)</u> Latitude: <u>34° 41' 56.57"</u> Longitude: <u>85° 32' 04.09"</u> Ellip. Height: <u>732.059'</u> Type of Mark: <u>BRASS Disk on Cone</u> Stamping on Mark: <u>Q120 1934</u> Weather Condition: <u>PC 83°</u>	Project Number: <u>71899</u> Survey Date: <u>4-3-12</u> Operator Name: <u>J SPEELMAN</u> Julian Day: <u>094</u> Session No. <u>1</u> Start Time: <u>4:24</u> End Time: <u>4:59</u> Data File Name: <u>88100</u> Type of Receiver: <u>TRIMBLE R9-V (4208128810)</u> Type of Antenna: <u>INTERNAL</u> Antenna Height: <u>2.0 m</u> to bottom of antenna mount
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Q 120-EE0971-BM-1-03APR2012



Q 120-EE0971-BM-2-03APR2012



Q 120-EE0971-BM-3SE-03APR2012



Q 120-EE0971-BM-3NW-03APR2012



Q 120-EE0971-BM-3NE-03APR2012

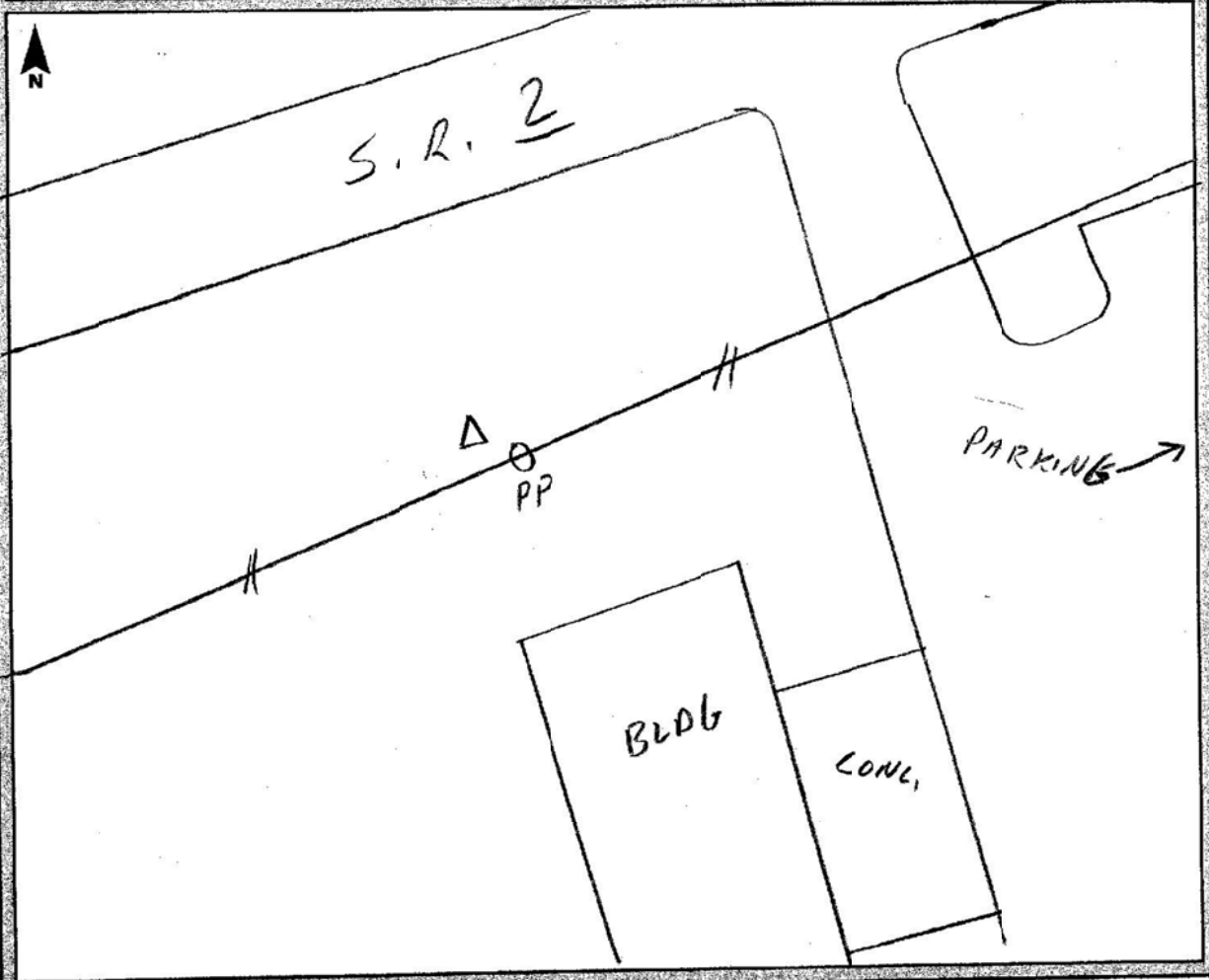


Q 120-EE0971-BM-3SW-03APR2012

GPS Observation Log Sheet



Project Name: <u>Jackson, Marshall and DeKalb Counties, AL</u>	Project Number: <u>71899</u>	Survey Date: <u>4/3/12</u>
Station Name: <u>X 479</u>	Operator Name: <u>Josh Nave</u>	
Latitude: <u>N34-54-49.687</u>	Jullian Day: <u>094</u>	Session No. <u>BASE</u>
Longitude: <u>W85-46-24.329</u>	Start Time: <u>8:39 AM</u>	End Time: <u>6:17 PM</u>
Ellip. Height: <u>528.61 FT</u>	Data File Name: <u>X479094A</u>	
Type of Mark: <u>SS ROD</u>	Type of Receiver: <u>Trimble 4000SSI</u>	
Stamping on Mark: <u>X 479 1983</u>	Type of Antenna: <u>Trimble M/L 2/2</u>	
Weather Condition: _____	Antenna Height: <u>6.562 FT</u>	to bottom of antenna mount





X 479-EE1500-1-03APR2012



X 479-EE1500-2-03APR2012



X 479-EE1500-3W-03APR2012



X 479-EE1500-3N-03APR2012



X 479-EE1500-3E-03APR2012

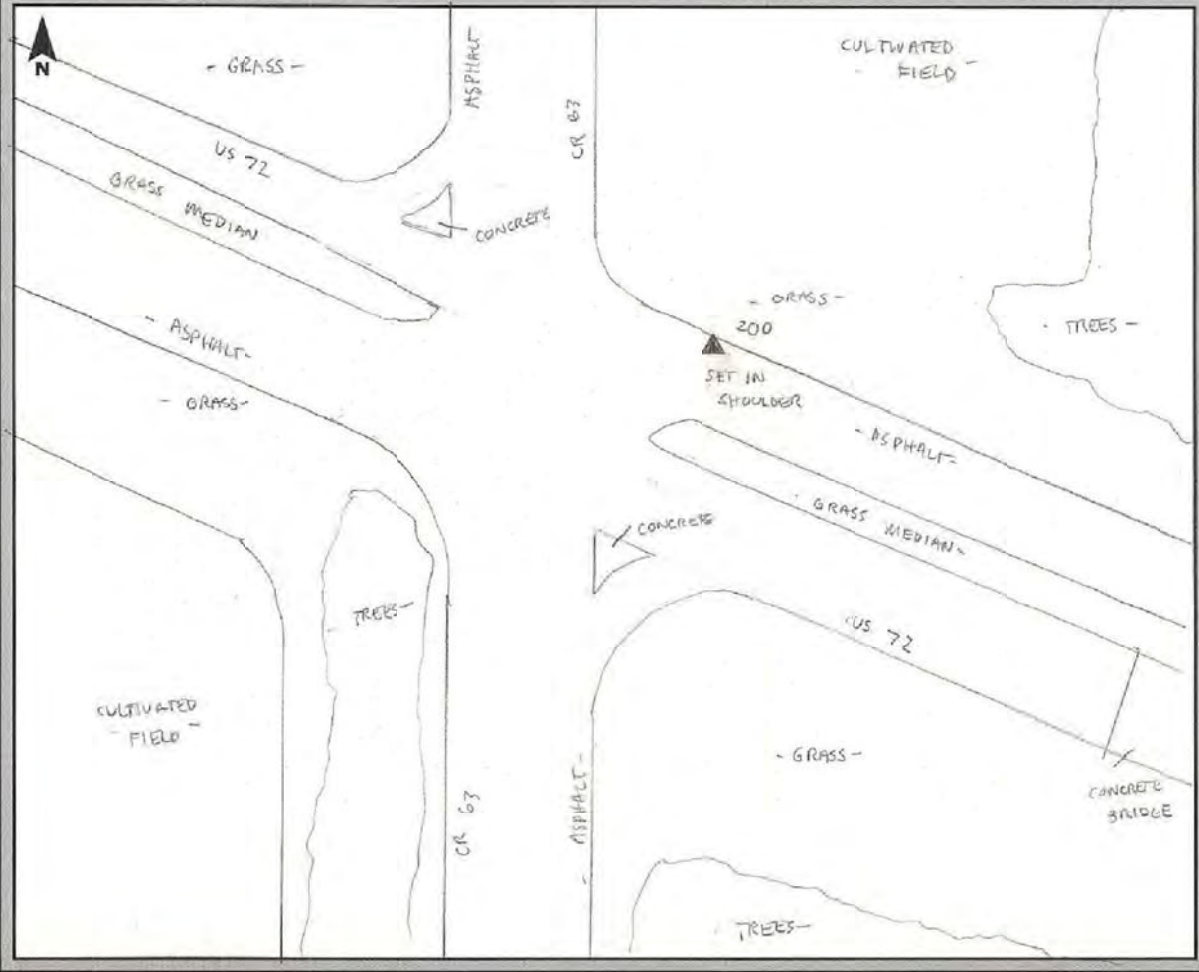


X 479-EE1500-3S-03APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>4/1/2012</u>
Station Name: <u>Z06</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N 34° 36' 32.01"</u>	Julian Day: <u>92</u>	Session No. <u>N/A</u>
Longitude: <u>W 86° 16' 12.21"</u>	Start Time: <u>8:34</u>	End Time: <u>8:38</u>
Ellip. Height: <u>155.0 m</u>	Data File Name: <u>AL-LIDAR_92-CJS</u>	
Type of Mark: <u>Mag Nail</u>	Type of Receiver: <u>R8-3 #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>R8-2 #0364</u>	
Weather Condition: <u>Foggy = 62°</u>	Antenna Height: <u>2.00 m</u> to bottom of antenna mount	





200-2-01APR2012



200-3SE-01APR2012

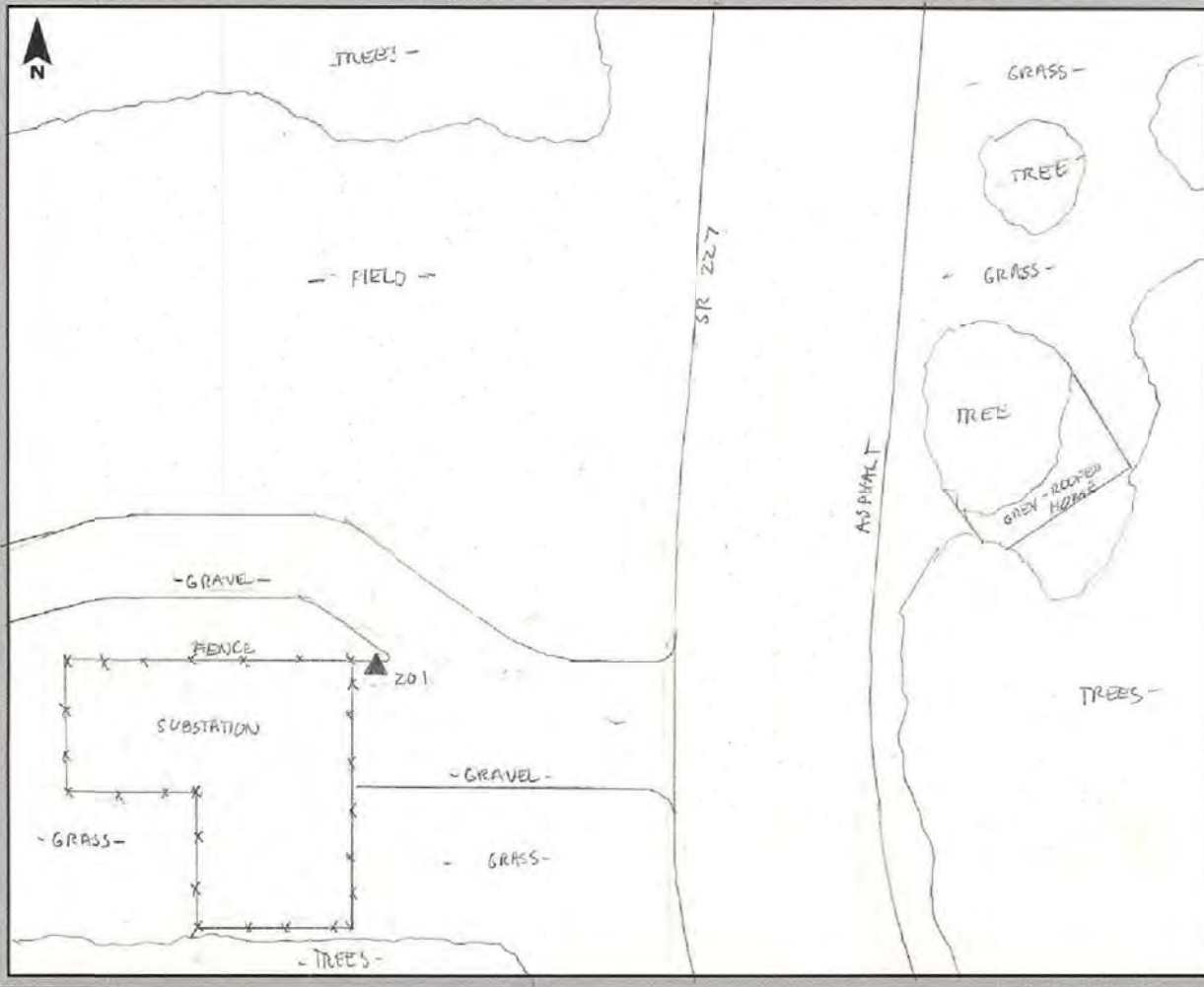


200-3NE-01APR2012

GPS Observation Log Sheet



Project Name:	<u>5 Co AL LIDAR</u>	Project Number:	<u>71899</u>	Survey Date:	<u>4/1/2012</u>
Station Name:	<u>201</u>	Operator Name:	<u>Cody Schneider</u>		
Latitude:	<u>N34° 19' 21.53"</u>	Julian Day:	<u>92</u>	Session No.:	<u>N/A</u>
Longitude:	<u>W85° 59' 56.85"</u>	Start Time:	<u>15:29</u>	End Time:	<u>15:33</u>
Ellip. Height:	<u>313.6 m</u>	Data File Name:	<u>AL_LIDAR_92_G53</u>		
Type of Mark:	<u>Nail w/ ribbon</u>	Type of Receiver:	<u>RB-3 #0364</u>		
Stamping on Mark:	<u>N/A</u>	Type of Antenna:	<u>RB-3 #0364</u>		
Weather Condition:	<u>Partly Cloudy ~ 80°</u>	Antenna Height:	<u>2.00 m</u> to bottom of antenna mount		





201-2-01APR2012



201-3W-01APR2012

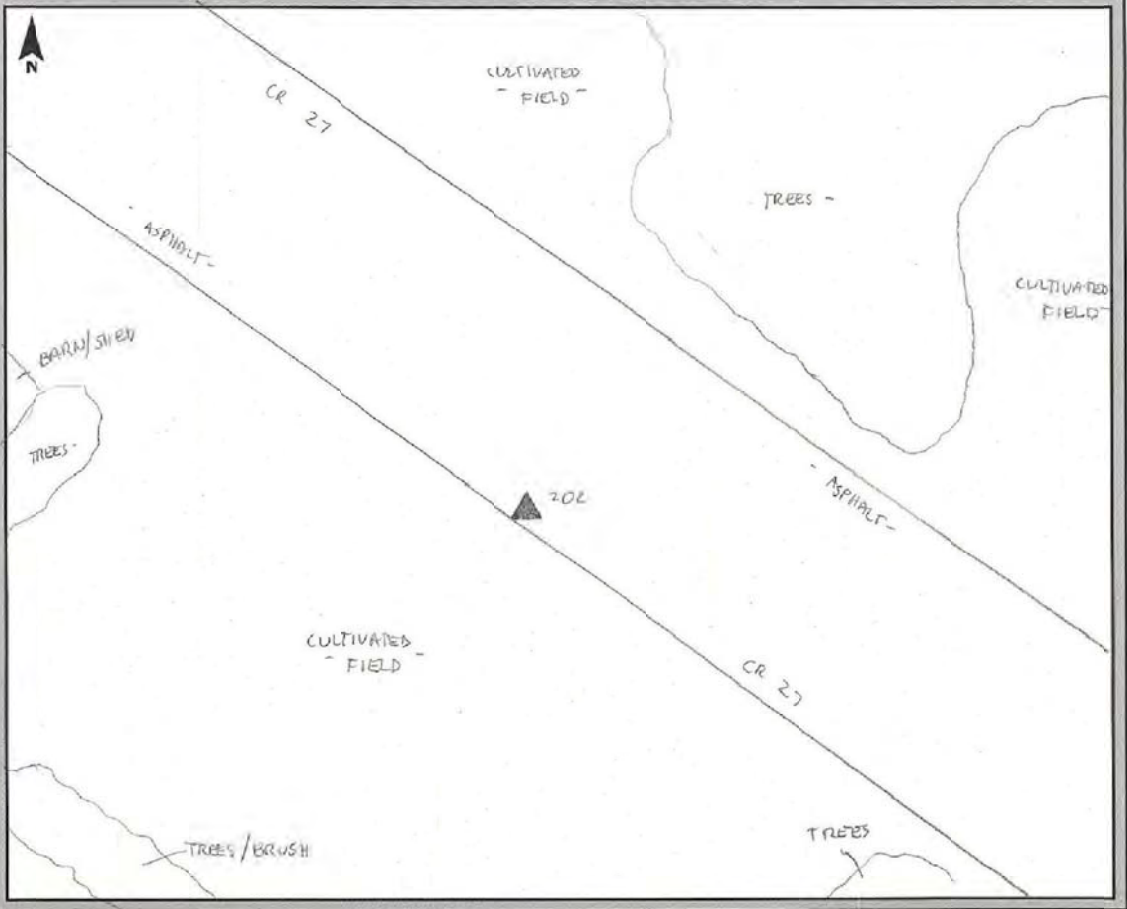


201-3N-01APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u> Survey Date: <u>4/2/2012</u>
Station Name: <u>202</u>	Operator Name: <u>Cody Schneider</u>
Latitude: <u>N 34° 36' 30.74"</u>	Julian Day: <u>93</u> Session No. <u>N/A</u>
Longitude: <u>W 85° 51' 38.79"</u>	Start Time: <u>16:06</u> End Time: <u>16:11</u>
Ellip. Height: <u>396.9 m</u>	Data File Name: <u>AL-LIDAR_02-CJS</u>
Type of Mark: <u>Mag Nail</u>	Type of Receiver: <u>RF-3 #0364</u>
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>RF-3 #0364</u>
Weather Condition: <u>Partly Cloudy @ 82°</u>	Antenna Height: <u>2.00 m</u> to bottom of antenna mount





202-2-02APR2012



202-3SW-02APR2012

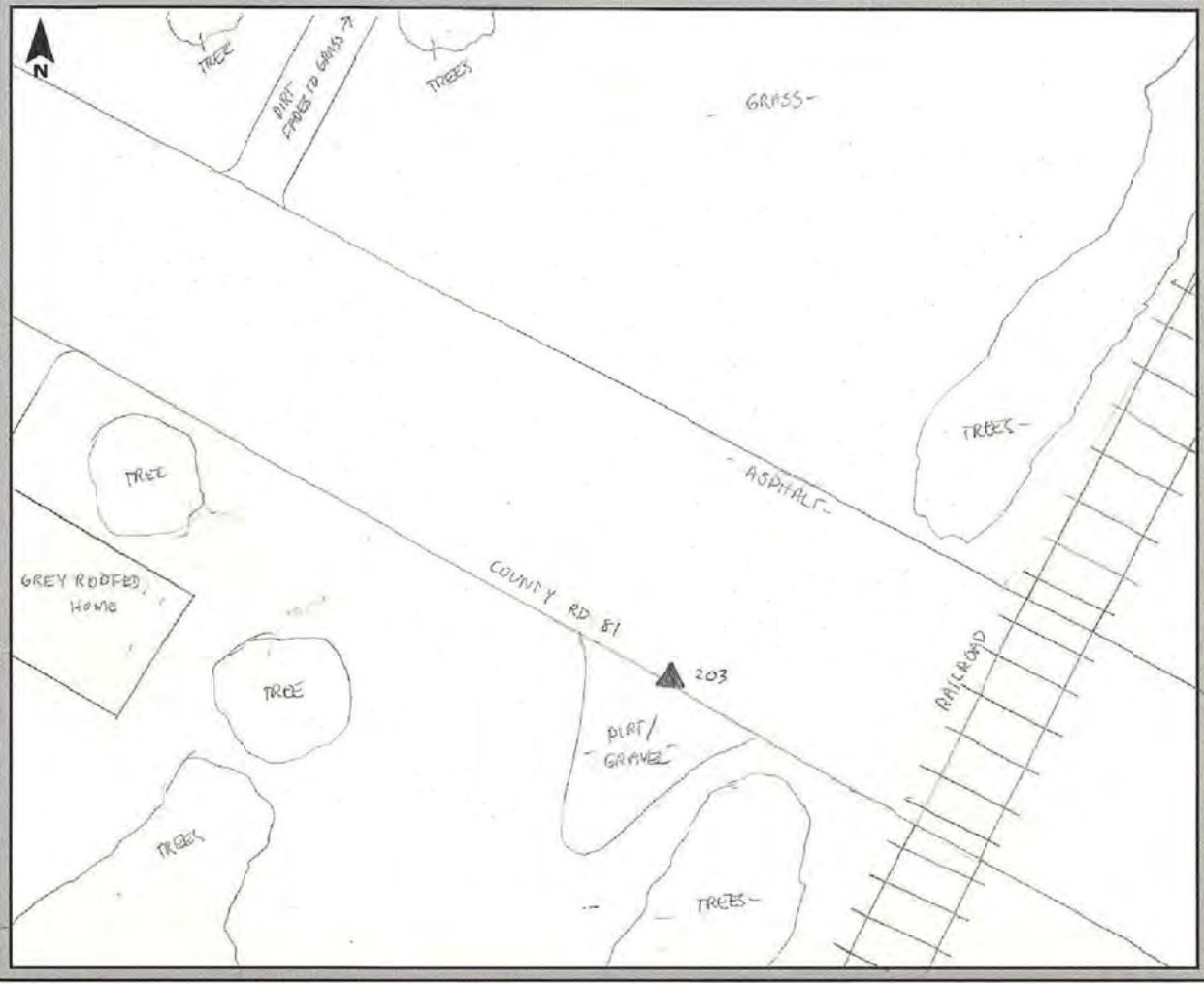


202-3SE-02APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71894</u>	Survey Date: <u>4/3/2012</u>
Station Name: <u>203</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N34° 22' 36.64"</u>	Julian Day: <u>94</u>	Session No. <u>N/A</u>
Longitude: <u>W85° 46' 35.30"</u>	Start Time: <u>14:52</u>	End Time: <u>14:56</u>
Ellip. Height: <u>231.8 m</u>	Data File Name: <u>A_LIDAR_94_CJS</u>	
Type of Mark: <u>Mag Nail</u>	Type of Receiver: <u>RE-3 #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>RE-3 #0364</u>	
Weather Condition: <u>Mostly Cloudy ≈ 80°</u>	Antenna Height: <u>2.00 m</u>	to bottom of antenna mount





203-2-03APR2012



203-3SW-03APR2012

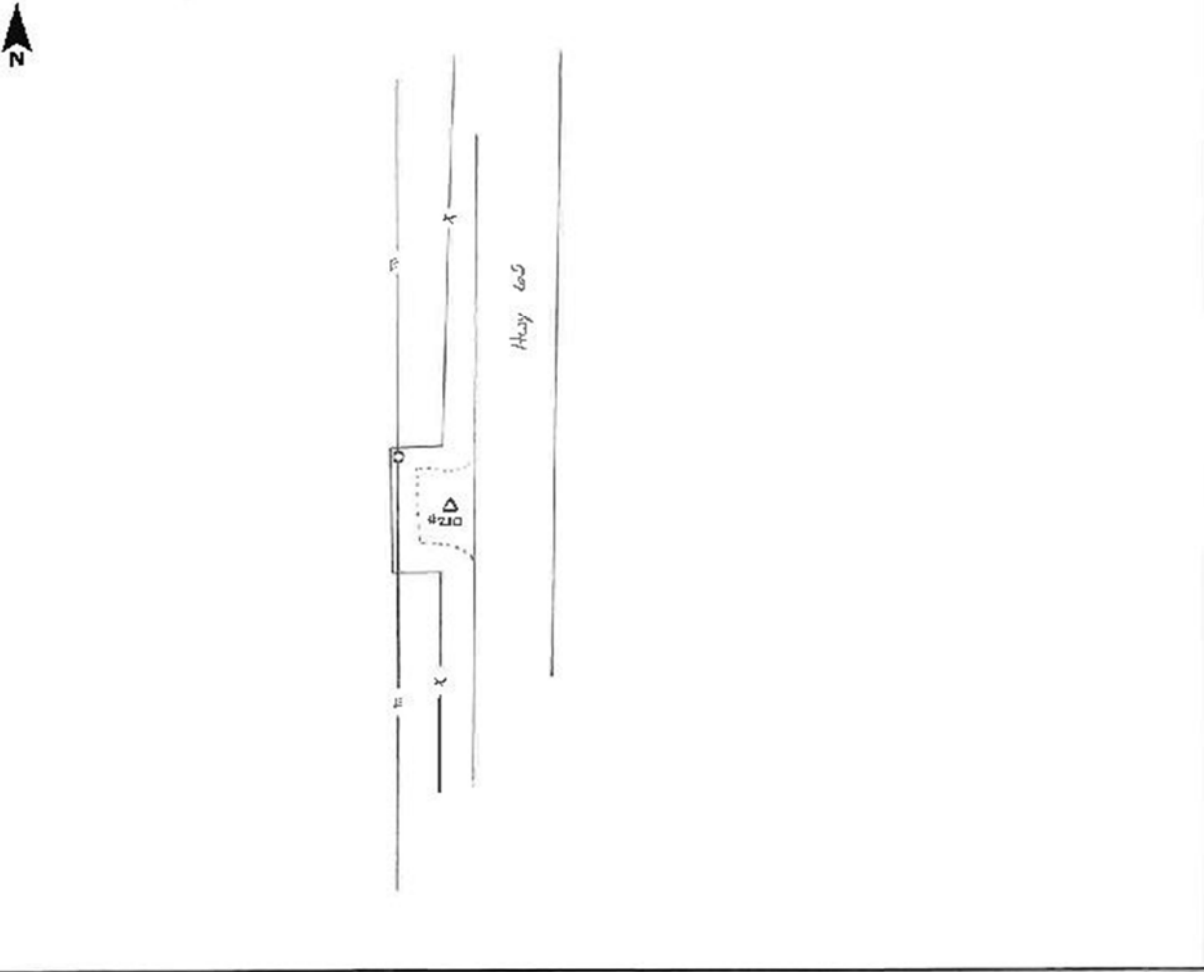


203-3NW-03APR2012

GPS Observation Log Sheet



Project Name: Jackson, Marshall and DeKalb Co, AL Project Number: 71899 Survey Date: 4/1/12
Station Name: Z10 Operator Name: Jed Nave
Latitude: N34° 47' 21.7" Julian Day: 092 Session No. RTK
Longitude: W86° 15' 01.9" Start Time: RTK End Time: RTK
Ellip. Height: 530.7 Data File Name: _____
Type of Mark: Nail Type of Receiver: R8-Z
Stamping on Mark: none Type of Antenna: R8-Z
Weather Condition: Sunny Antenna Height: 2.0m to bottom of antenna mount





210-2-01APR2012



210-3N-01APR2012

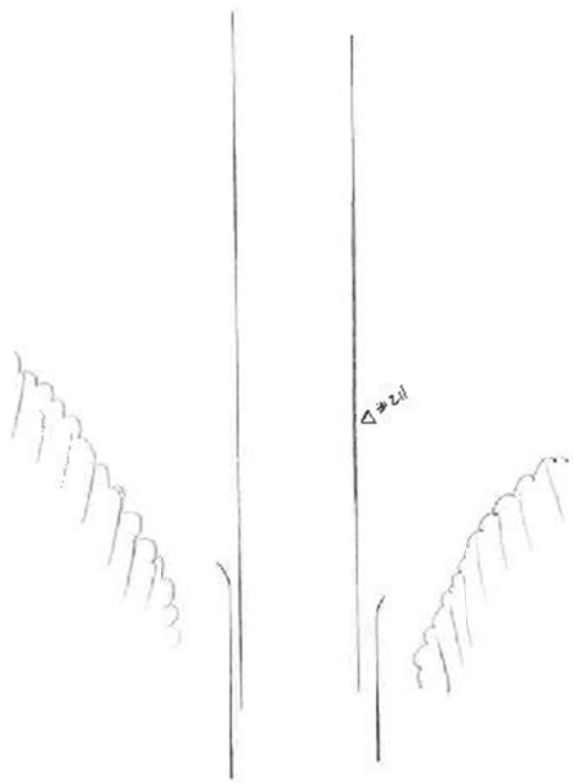


210-3W-01APR2012

GPS Observation Log Sheet



Project Name: Jackson, Marshall, and DeKalb Co, AL Project Number: 71899 Survey Date: 4/1/12
Station Name: Z11 Operator Name: Josh Nave
Latitude: N 34 47 33.9 Julian Day: 092 Session No. RTK
Longitude: W 86 15 07.5 Start Time: RTK End Time: RTK
Ellip. Height: 535.1 Data File Name: _____
Type of Mark: Nail Type of Receiver: R8-Z
Stamping on Mark: None Type of Antenna: K8-Z
Weather Condition: Sunny Antenna Height: 2.0m to bottom of antenna mount





211-2-01APR2012



211-3S-01APR2012

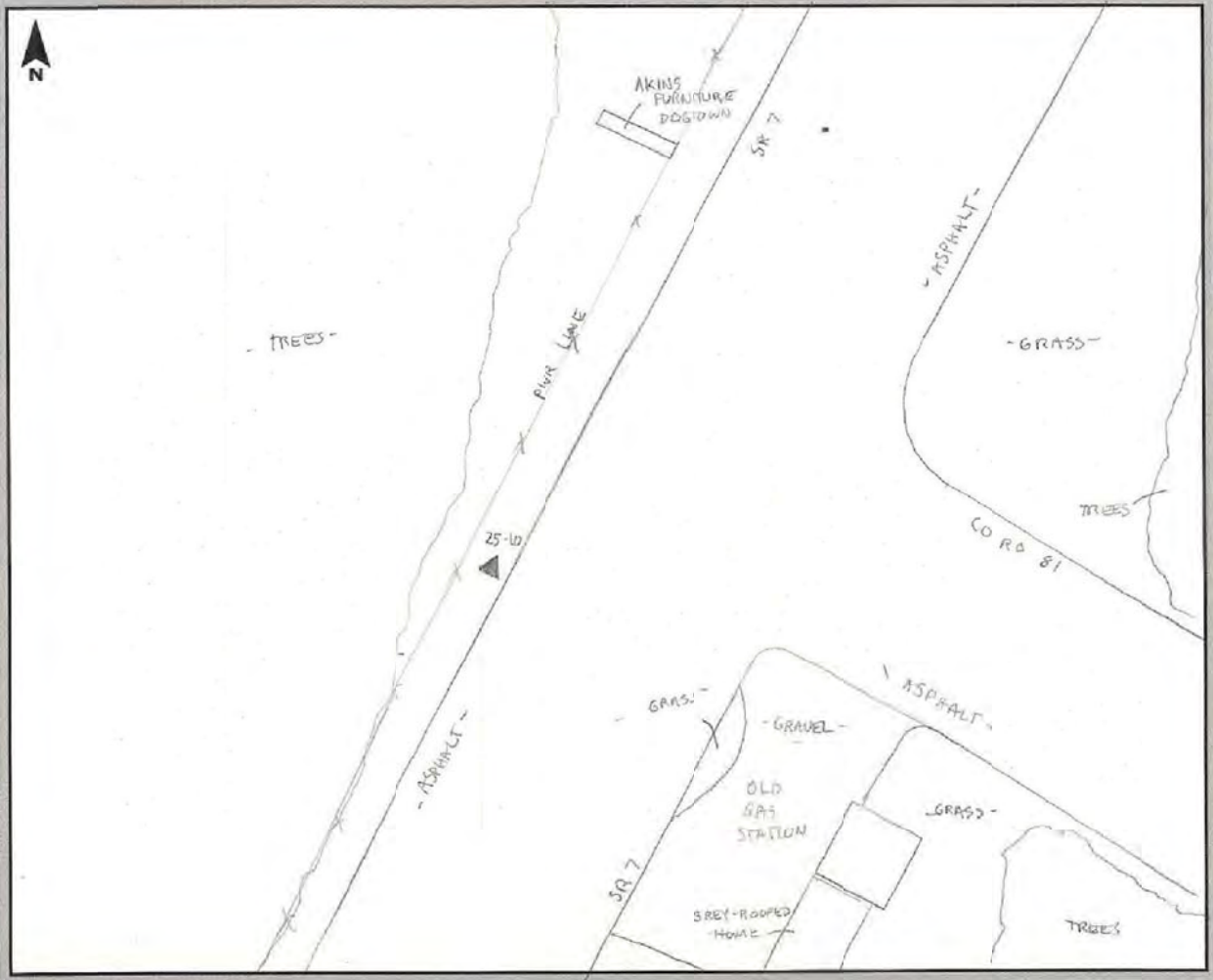


211-3E-01APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>4/2/2012</u>
Station Name: <u>25-10</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N 34° 22' 33.70"</u>	Julian Day: <u>93</u>	Session No. <u>N/A</u>
Longitude: <u>W 85° 46' 44.23"</u>	Start Time: <u>10:26</u>	End Time: <u>18:45</u>
Ellip. Height: <u>242.9 m</u>	Data File Name: <u>77790930</u>	
Type of Mark: <u>Monument pair</u>	Type of Receiver: <u>5800 #7779</u>	
Stamping on Mark: <u>25-10 1990</u>	Type of Antenna: <u>5800 #7779</u>	
Weather Condition: <u>Partly Cloudy ~ 75°</u>	Antenna Height: <u>2.00 m</u>	to bottom of antenna mount





25 10-EE2309-1-02APR2012



25 10-EE2309-2-02APR2012



25 10-EE2309-3SE-02APR2012



25 10-EE2309-3NW-02APR2012



25 10-EE2309-3NE-02APR2012

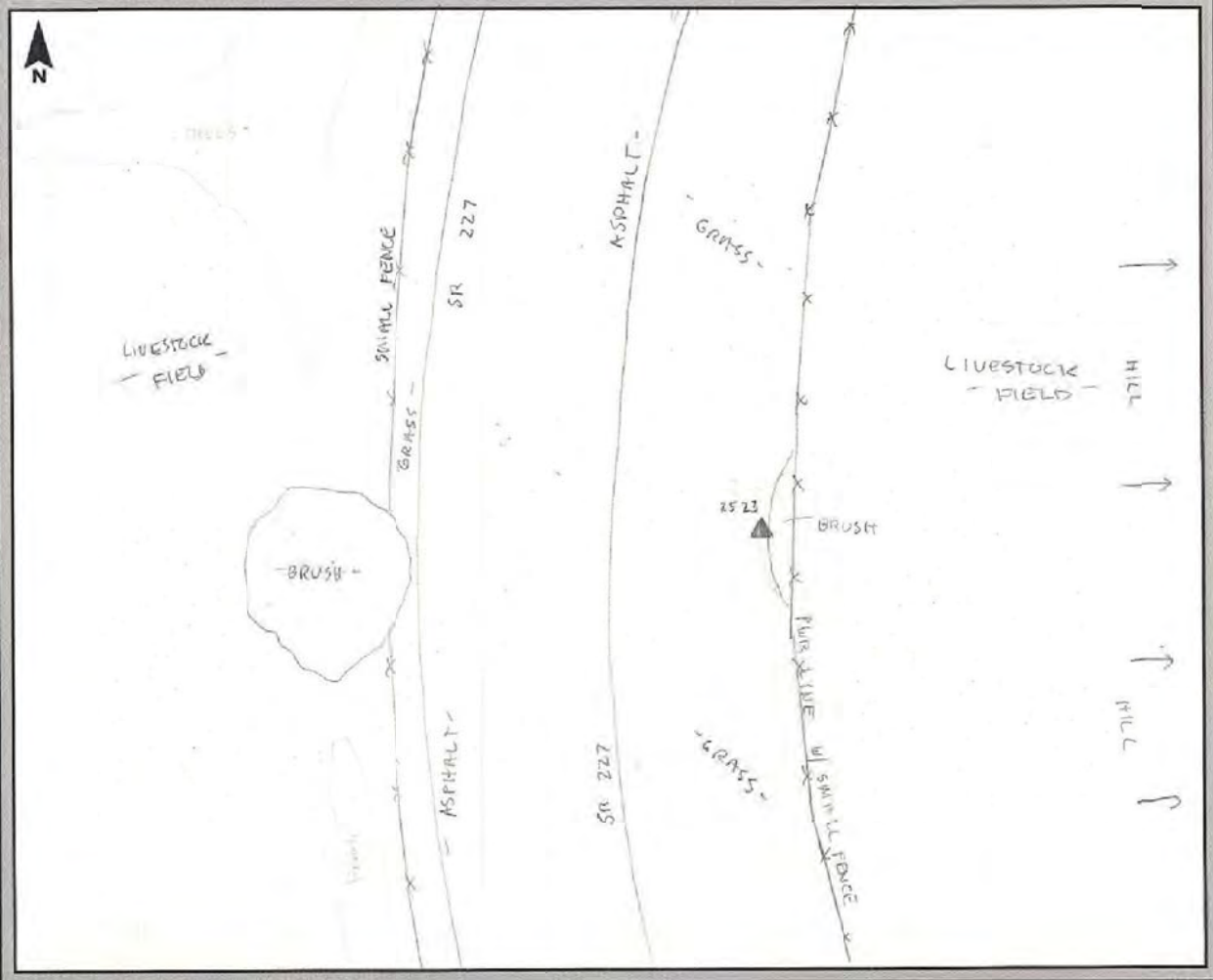


25 10-EE2309-3SW-02APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>4/1/2012</u>
Station Name: <u>25 23</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N24°19'53.82"</u>	Julian Day: <u>92</u>	Session No. <u>N/A</u>
Longitude: <u>W85°59'55.83"</u>	Start Time: <u>1500</u>	End Time: <u>18:04</u>
Ellip. Height: <u>311.4 m</u>	Data File Name: <u>21130922</u>	
Type of Mark: <u>Monument pair</u>	Type of Receiver: <u>RE-2 #2113</u>	
Stamping on Mark: <u>25-23 1993</u>	Type of Antenna: <u>RE-2 #2113</u>	
Weather Condition: <u>Partly Cloudy ~80°</u>	Antenna Height: <u>2.25 m</u> to bottom of antenna mount	





25 23-AA2951-1-01APR2012



25 23-AA2951-2-01APR2012



25 23-AA2951-3E-01APR2012



25 23-AA2951-3S-01APR2012

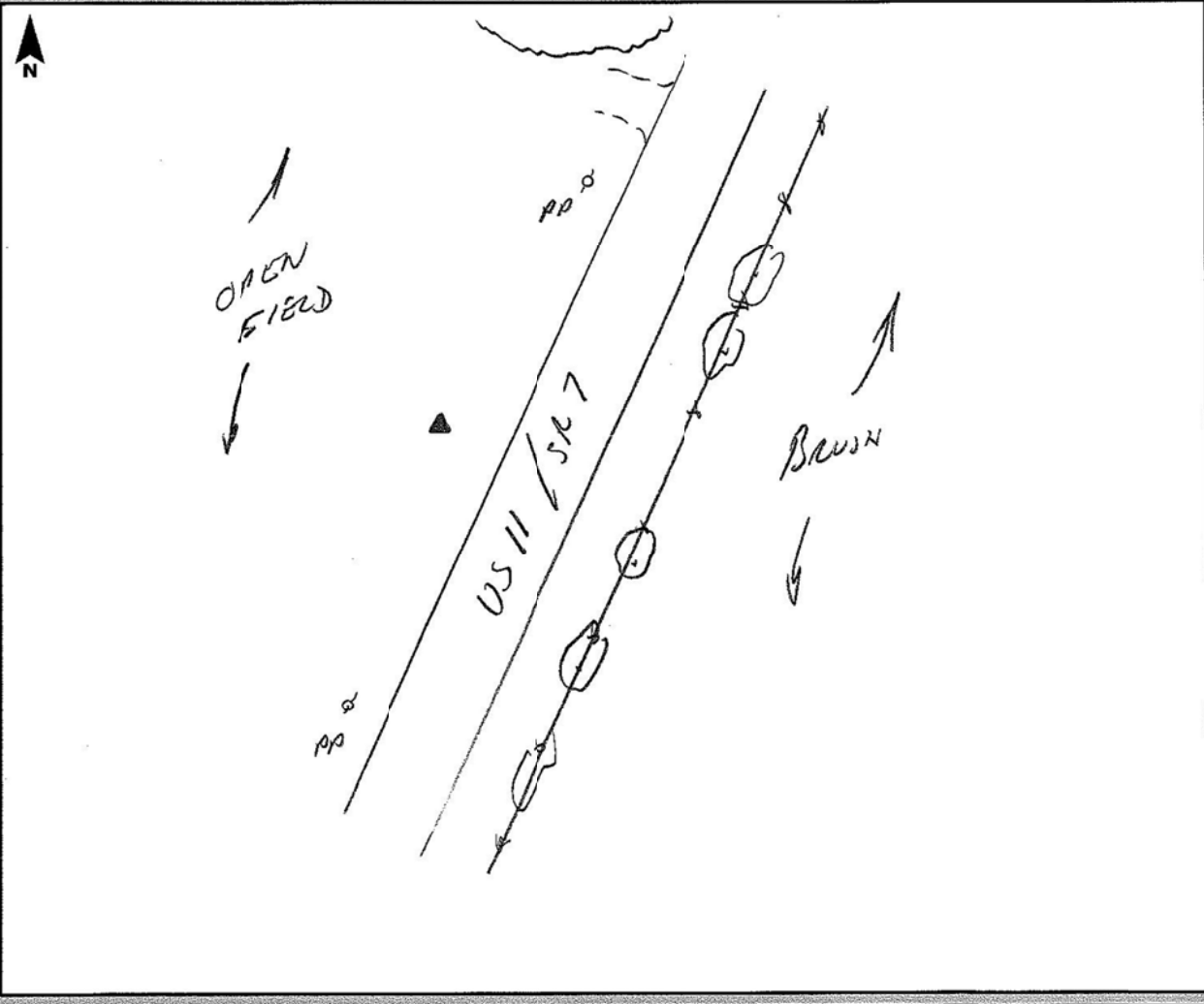


25 23-AA2951-3N-01APR2012

GPS Observation Log Sheet



Project Name: <u>LIDAR OC - ALA. 3 County</u>	Project Number: <u>71899</u>	Survey Date: <u>4-2-12</u>
Station Name: <u>25-46 (AA 1974)</u>	Operator Name: <u>J Spelman</u>	
Latitude: <u>39° 36' 59.90"</u>	Julian Day: <u>094</u>	Session No. <u>2</u>
Longitude: <u>85° 36' 42.53"</u>	Start Time: <u>2:56</u>	End Time: <u>7:17</u>
Ellip. Height: <u>261.095 m</u>	Data File Name: <u>62100942.DAT</u>	
Type of Mark: <u>BRASS DISK IN CONE</u>	Type of Receiver: <u>TRIMBLE 4700</u>	
Stamping on Mark: <u>25-46 1993</u>	Type of Antenna: <u>MURDOCKSON W/ GP</u>	
Weather Condition: <u>PC 80°</u>	Antenna Height: <u>2.0 m</u>	to bottom of antenna mount





25 46-AA2974-BM-1-03APR2012



25 46-AA2974-BM-2-03APR2012



25 46-AA2974-BM-3NE-03APR2012



25 46-AA2974-BM-3SW-03APR2012



25 46-AA2974-BM-3NW-03APR2012

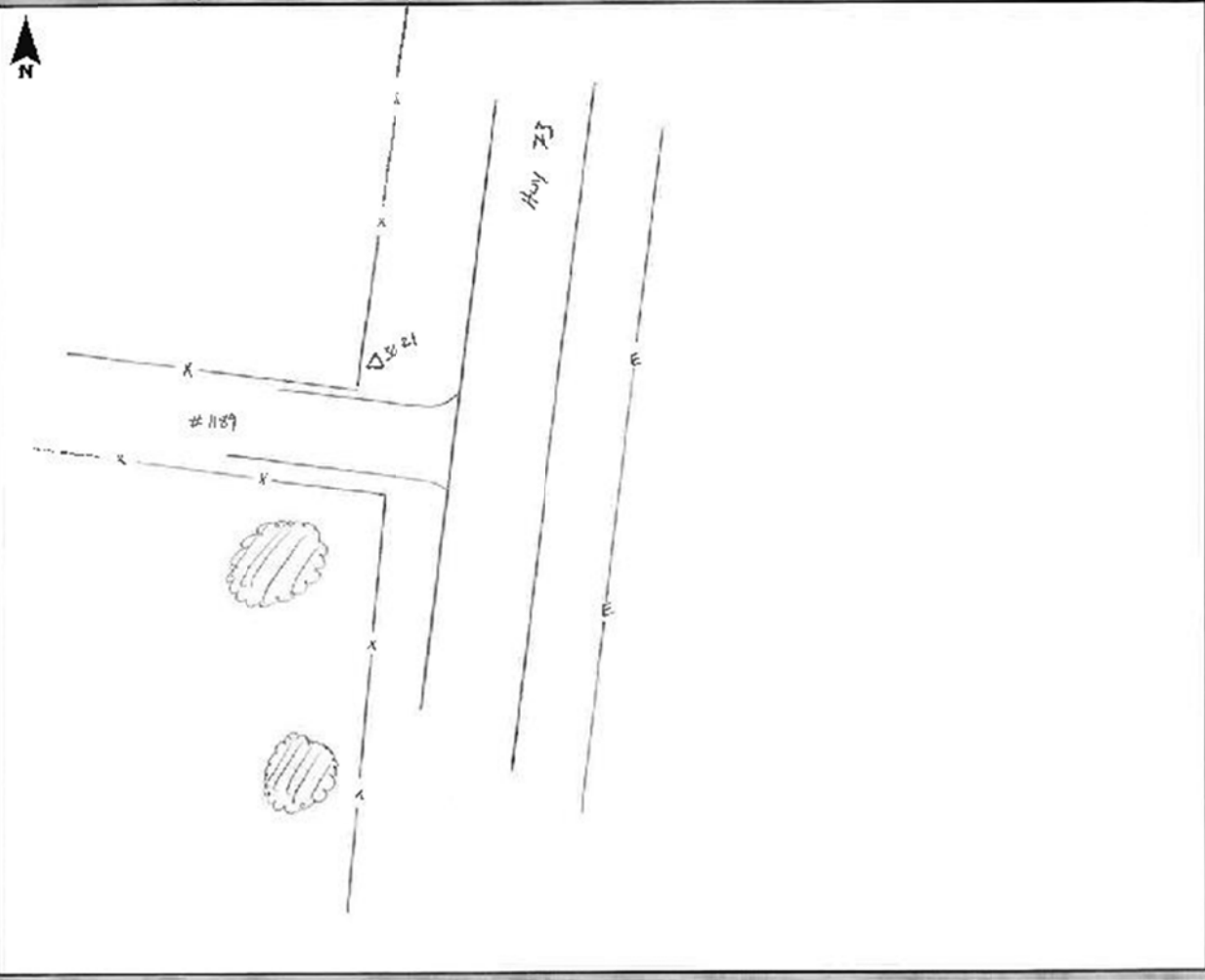


25 46-AA2974-BM-3SE-03APR2012

GPS Observation Log Sheet



Project Name: <u>Jackson, Marshall and DeKalb Co., AL</u>	Project Number: <u>7:899</u>	Survey Date: <u>4/4/12</u>
Station Name: <u>St 21</u>	Operator Name: <u>Josh N. [unclear]</u>	
Latitude: <u>N 34 52 27.6</u>	Julian Day: <u>095</u>	Session No. <u>Static</u>
Longitude: <u>W 85 36 24.9</u>	Start Time: <u>10:53</u>	End Time: <u>3:22</u>
Ellip. Height: <u>1596.1'</u>	Data File Name: <u>21130950.T01</u>	
Type of Mark: <u>Disk in Conc.</u>	Type of Receiver: <u>RX-3</u>	
Stamping on Mark: <u>30-21/1993</u>	Type of Antenna: <u>RX-3</u>	
Weather Condition: <u>Sunny</u>	Antenna Height: <u>2.25m</u>	to bottom of antenna mount





36 21-AA2997-5-04APR2012(2)



36 21-AA2997-2-04APR2012



36 21-AA2997-3W-04APR2012



36 21-AA2997-3S-04APR2012

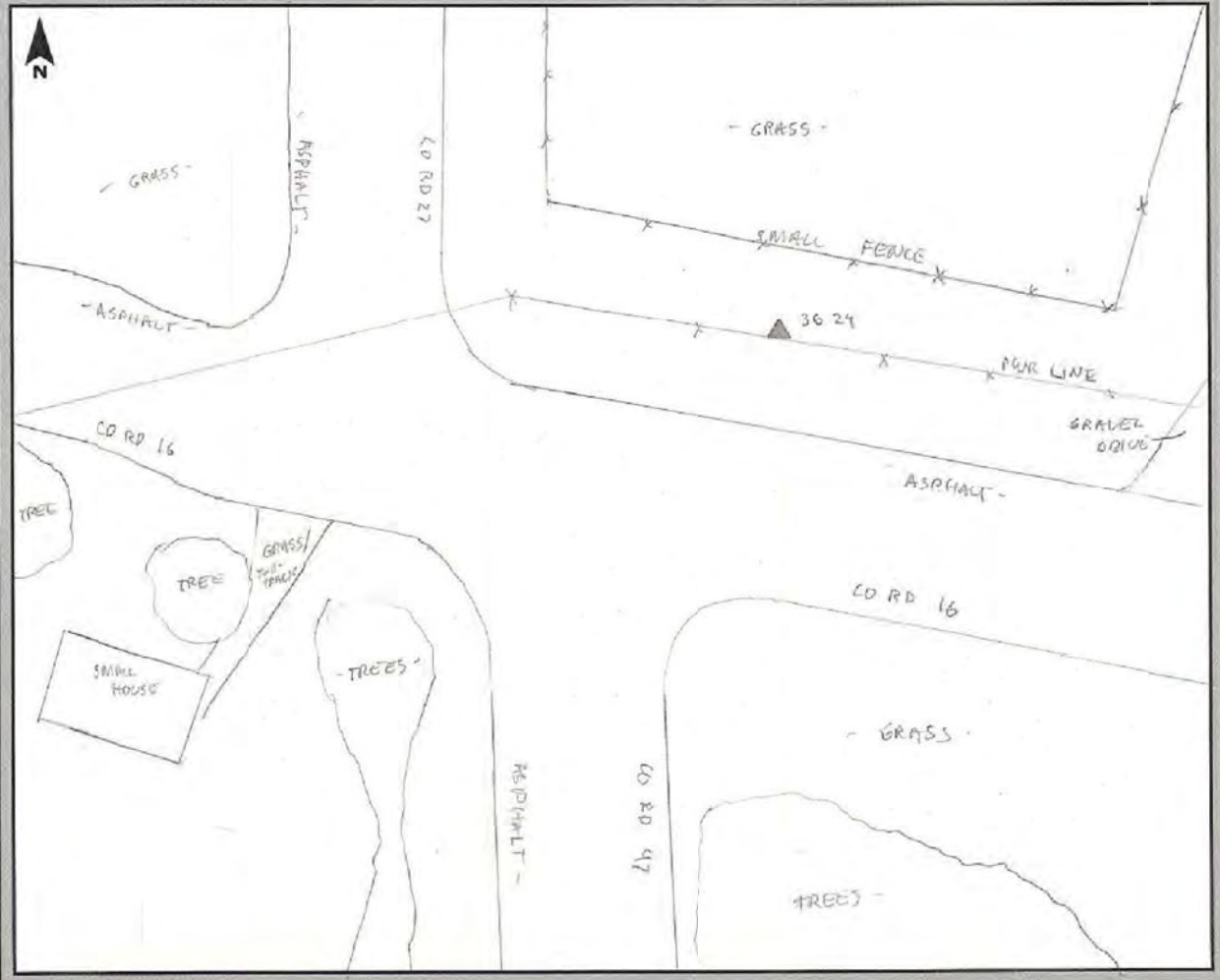


36 21-AA2997-3N-04APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71999</u>	Survey Date: <u>9/2/2012</u>
Station Name: <u>36 29</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N 34° 36' 09.15"</u>	Julian Day: <u>93</u>	Session No. <u>N/A</u>
Longitude: <u>W 85° 51' 21.13"</u>	Start Time: <u>11:38</u>	End Time: <u>12:38</u>
Ellip. Height: <u>410.4 m</u>	Data File Name: <u>3629093A</u>	
Type of Mark: <u>Monument pair</u>	Type of Receiver: <u>RE-3 #0364</u>	
Stamping on Mark: <u>36-29 1993</u>	Type of Antenna: <u>RE-3 #0364</u>	
Weather Condition: <u>Partly Cloudy 278°</u>	Antenna Height: <u>2.00 m</u>	to bottom of antenna mount





36 29-AA3005-1-02APR2012



36 29-AA3005-2-02APR2012



36 29-AA3005-3E-02APR2012



36 29-AA3005-3W-02APR2012



36 29-AA3005-3N-02APR2012

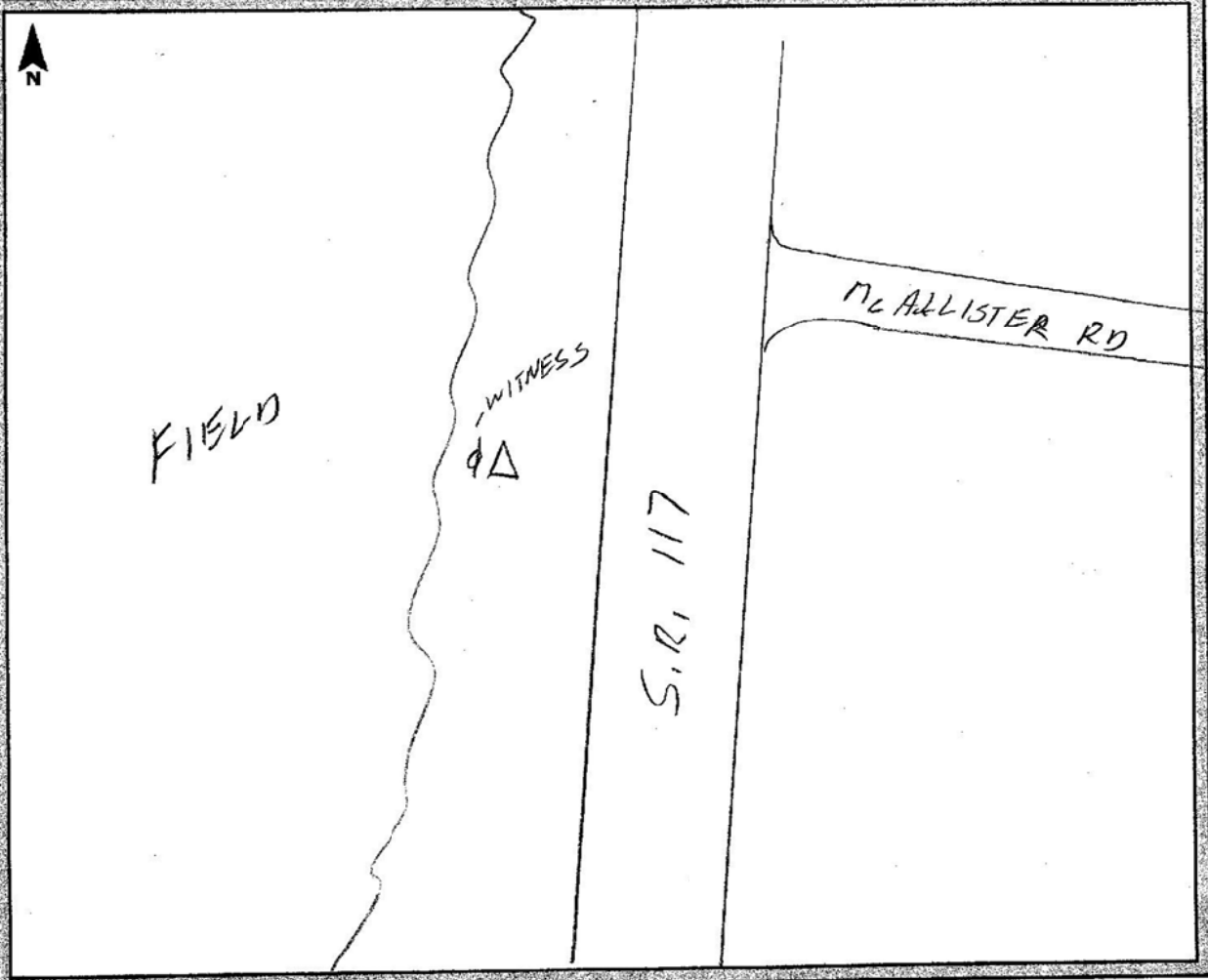


36 29-AA3005-3S-02APR2012

GPS Observation Log Sheet



Project Name: <u>Jackson, Marshall and DeKalb Counties, AL</u>	Project Number: <u>71899</u>	Survey Date: <u>4/2/12</u>
Station Name: <u>36 36</u>	Operator Name: <u>Josh Nave</u>	
Latitude: <u>N 34-53-03.038</u>	Julian Day: <u>093</u>	Session No. <u>STATIC</u>
Longitude: <u>W 85-51-33.731</u>	Start Time: <u>4:34 PM</u>	End Time: <u>5:31 PM</u>
Ellip. Height: <u>511.15 FT</u>	Data File Name: <u>3636093A</u>	
Type of Mark: <u>DISK IN CONG.</u>	Type of Receiver: <u>Trimble R82</u>	
Stamping on Mark: <u>36 36 1990</u>	Type of Antenna: <u>Trimble R82</u>	
Weather Condition: _____	Antenna Height: <u>6.89 FT</u>	to bottom of antenna mount





36 36-AA3012-1 02APR2012



36 36-AA3012-2-02APR2012



36 36-AA3012-3E-02APR2012



36 36-AA3012-3W-02APR2012



36 36-AA3012-3N-02APR2012



36 36-AA3012-3S-02APR2012

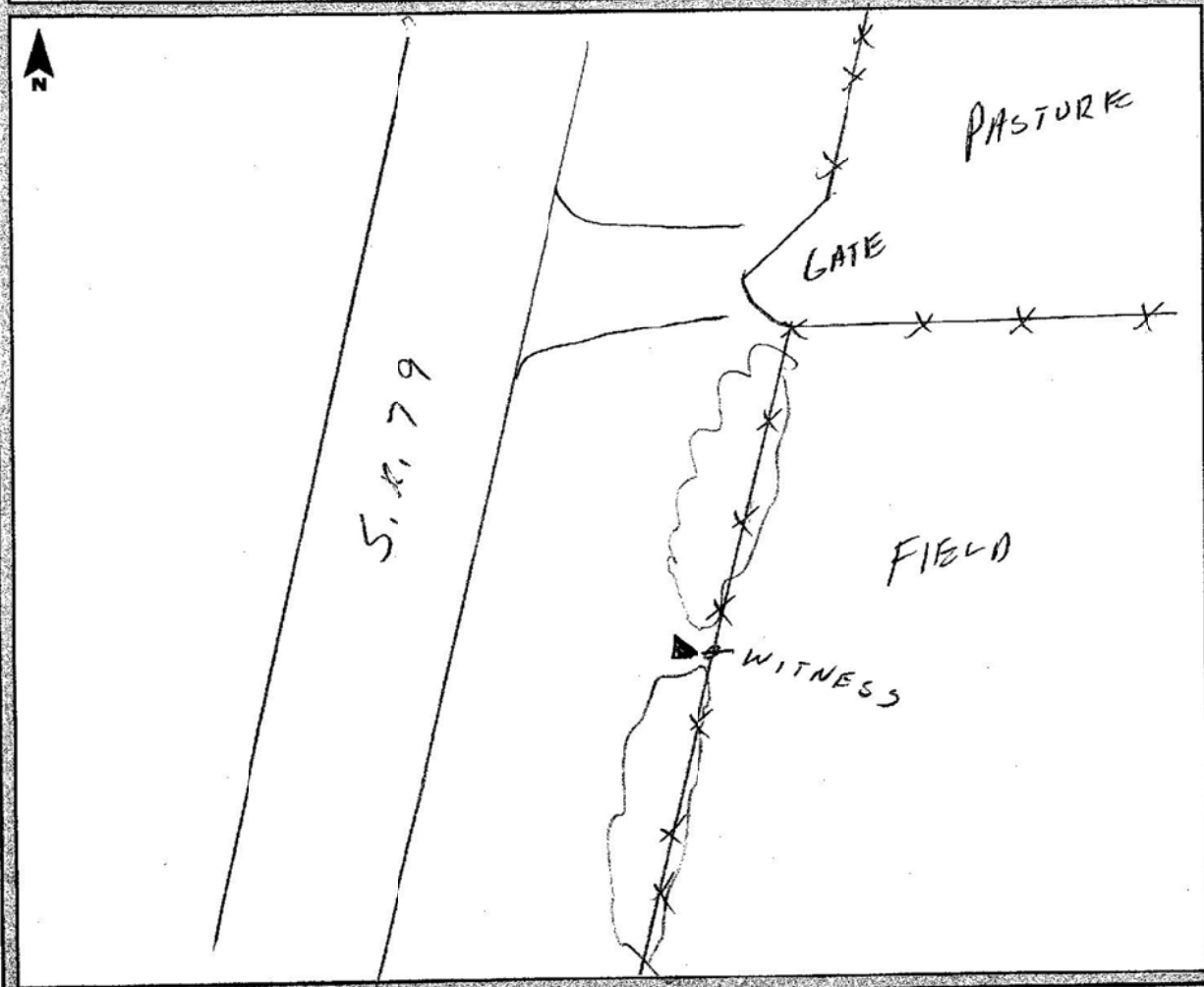
GPS Observation Log Sheet

W
WOOLPERT

Project Name: Jackson, Marshall and DeKalb Counties, AL
Station Name: 36 47
Latitude: N 34-51-33.260
Longitude: W 86-06-05.083
Ellip. Height: 1607.10 FT
Type of Mark: DISK IN CONC.
Stamping on Mark: 36-47 1990
Weather Condition:

Project Number: 71899
Operator Name: Josh Nave
Julian Day: 091
Start Time: 10:19 AM
Data File Name: 0614091#
Type of Receiver: Trimble R83
Type of Antenna: Trimble R83
Antenna Height: 6.562 to bottom of antenna mount

Survey Date: 3/31/12
Session No.: BASE
End Time: 3:52 PM





36 47-AA3022-1-31MAR2012



36 47-AA3022-2-31MAR2012



36 47-AA3022-3E-31MAR2012

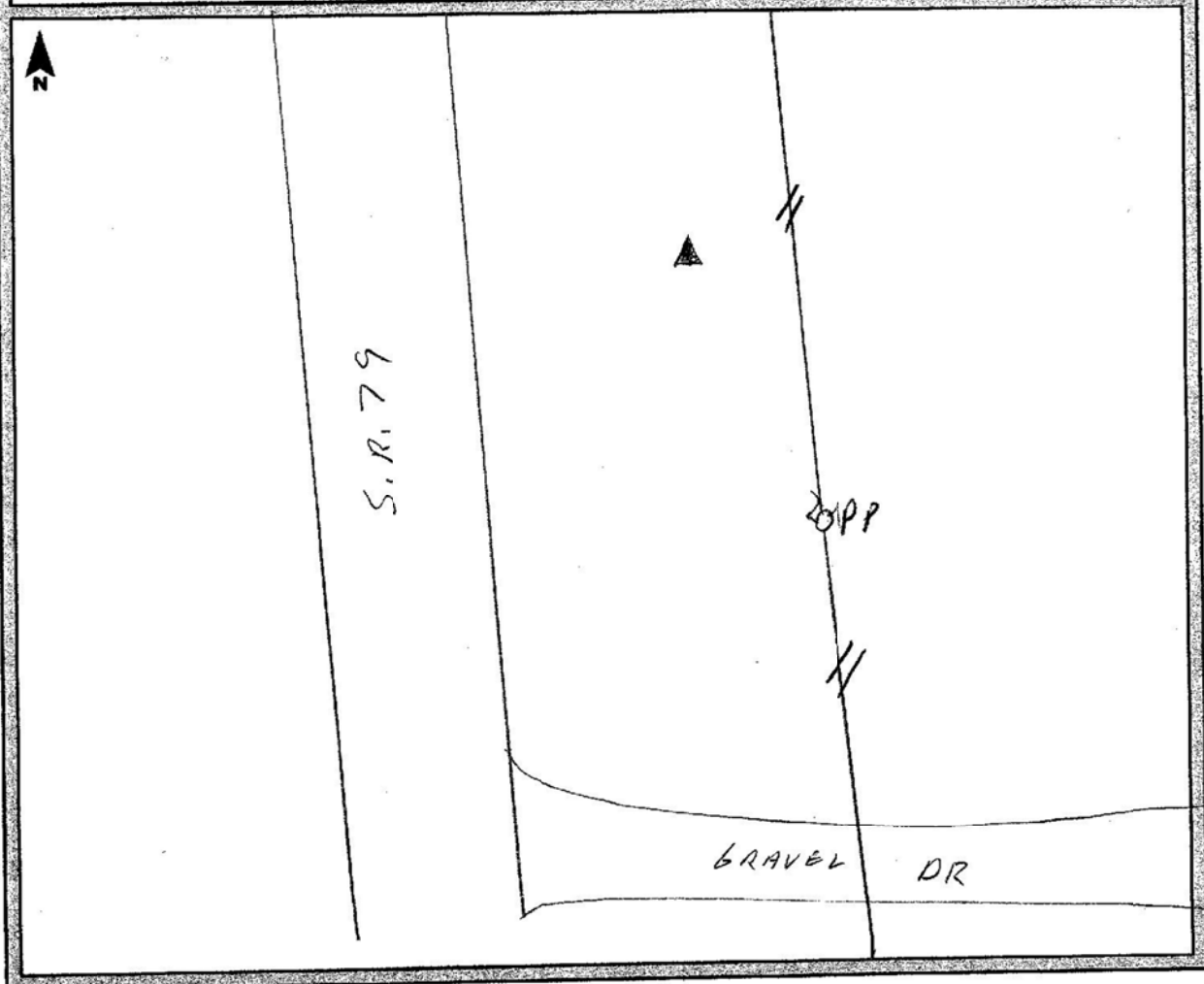


36 47-AA3022-3N-31MAR2012

GPS Observation Log Sheet



Project Name: Jackson, Marshall and DeKalb Counties, AL **Project Number:** 71899 **Survey Date:** 3/31/12
Station Name: 36 48 **Operator Name:** Josh Nave
Latitude: N 34-46-41.346 **Julian Day:** 091 **Session No.:** Static
Longitude: W 86-07-03.12 **Start Time:** 1:50 PM **End Time:** 2:24 PM
Ellip. Height: 1473.54 FT **Data File Name:** 59340911
Type of Mark: Disk in conc. **Type of Receiver:** Trimble R82
Stamping on Mark: 36-48 1990 **Type of Antenna:** Trimble R82
Weather Condition: **Antenna Height:** 6.89 FT to bottom of antenna mount





36 48-AA3023-1-31MAR2012



36 48-AA3023-2-31MAR2012



36 48-AA3023-3E-31MAR2012



36 48-AA3023-3W-31MAR2012



36 48-AA3023-3N-31MAR2012

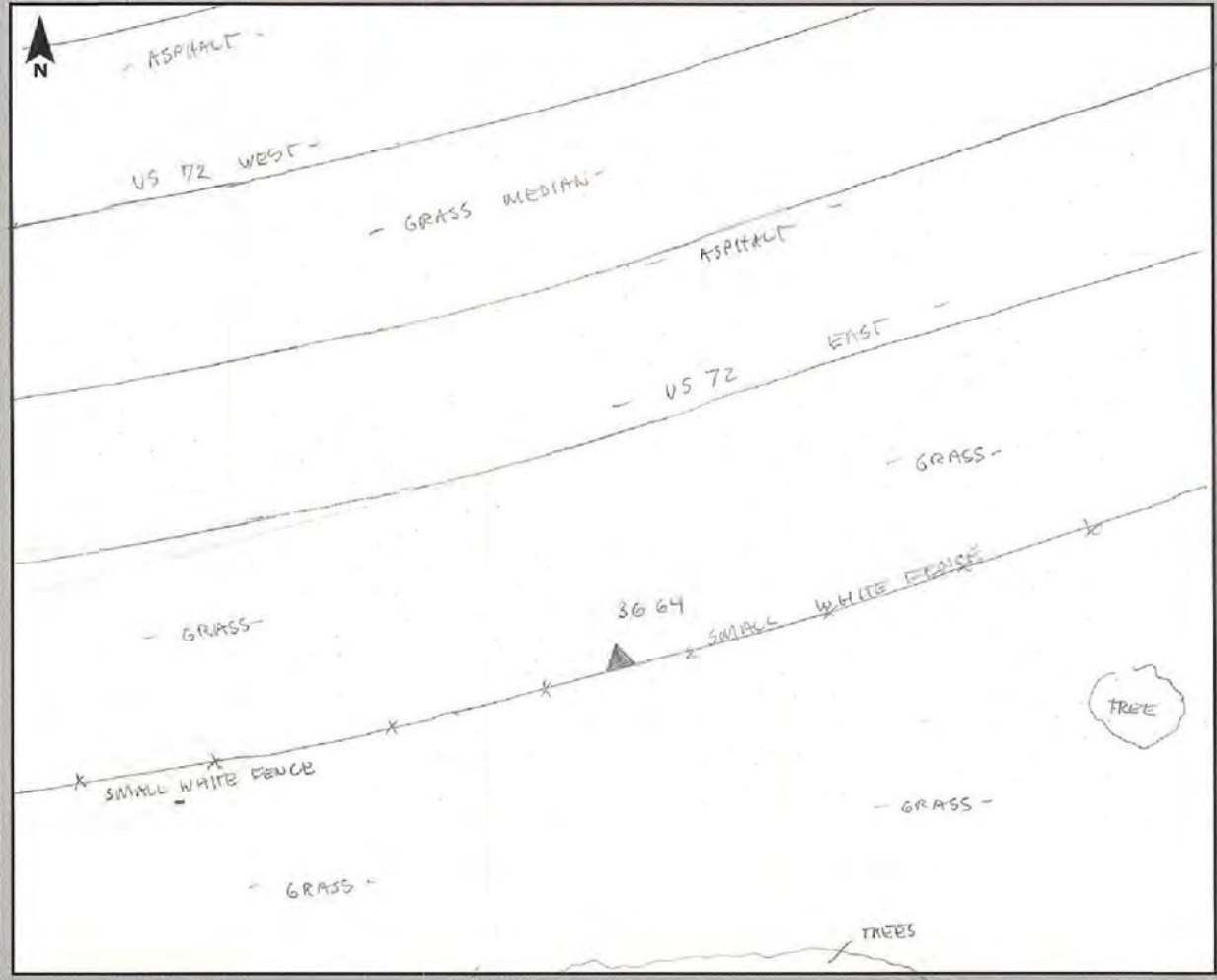


36 48-AA3023-3S-31MAR2012

GPS Observation Log Sheet



Project Name:	5 Co AL LIDAR	Project Number:	71899	Survey Date:	3/30/2012
Station Name:	36 64	Operator Name:	Cody Schneider		
Latitude:	N34°36'24.72"	Julian Day:	90	Session No.:	N/A
Longitude:	W86°15'10.48"	Start Time:	11:29	End Time:	12:26
Ellip. Height:	157.3 m	Data File Name:	3664090A		
Type of Mark:	FBN	Type of Receiver:	RE-3 #0364		
Stamping on Mark:	36-64 1993	Type of Antenna:	RE-3 #0364		
Weather Condition:	Cloudy ~ 72°	Antenna Height:	2.00 m	to bottom of antenna mount	





36 64-AA3039-FBN-1-30MAR2012



36 64-AA3039-FBN-2-30MAR2012



36 64-AA3039-FBN-3NE-30MAR2012



36 64-AA3039-FBN-3SW-30MAR2012



36 64-AA3039-FBN-3SE-30MAR2012

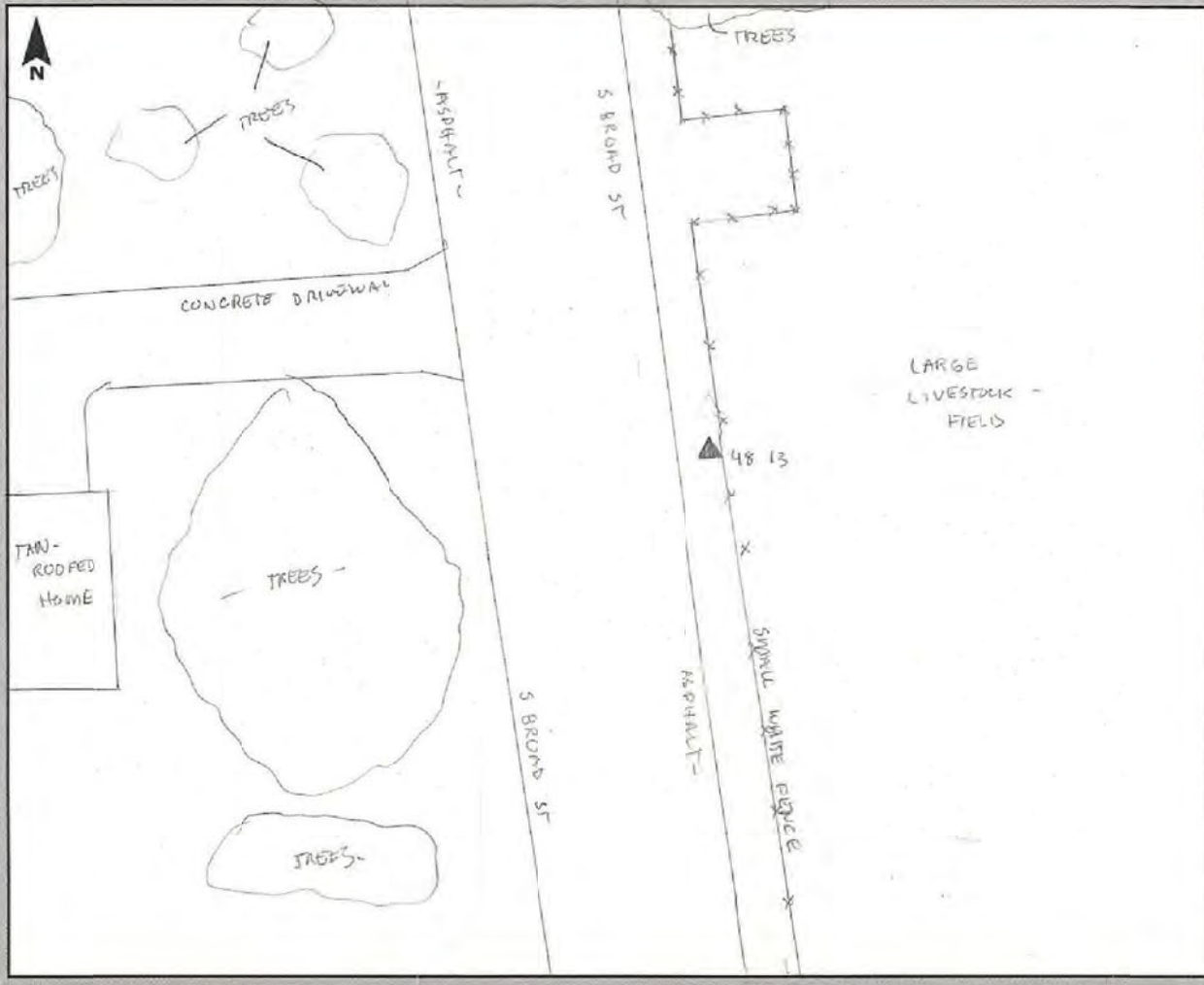


36 64-AA3039-FBN-3NW-30MAR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>071899</u>	Survey Date: <u>3/28/2012</u>
Station Name: <u>48 13</u>	Operator Name: <u>Curly Schneider</u>	
Latitude: <u>N34° 13' 55.83"</u>	Julian Day: <u>88</u>	Session No. <u>N/A</u>
Longitude: <u>W86° 12' 16.21"</u>	Start Time: <u>13:02</u>	End Time: <u>17:33</u>
Ellip. Height: <u>296,541 m</u>	Data File Name: <u>21130880</u>	
Type of Mark: <u>FBN</u>	Type of Receiver: <u>R8-2 #2113</u>	
Stamping on Mark: <u>48-13 1993</u>	Type of Antenna: <u>R8-2 #2113</u>	
Weather Condition: <u>Partly Cloudy ≈ 72°</u>	Antenna Height: <u>2.25 m</u>	to bottom of antenna mount





48 13-AA3052-FBN-1-28MAR2012



48 13-AA3052-FBN-2-28MAR2012



48 13-AA3052-FBN-3E-28MAR2012



48 13-AA3052-FBN-3S-28MAR2012

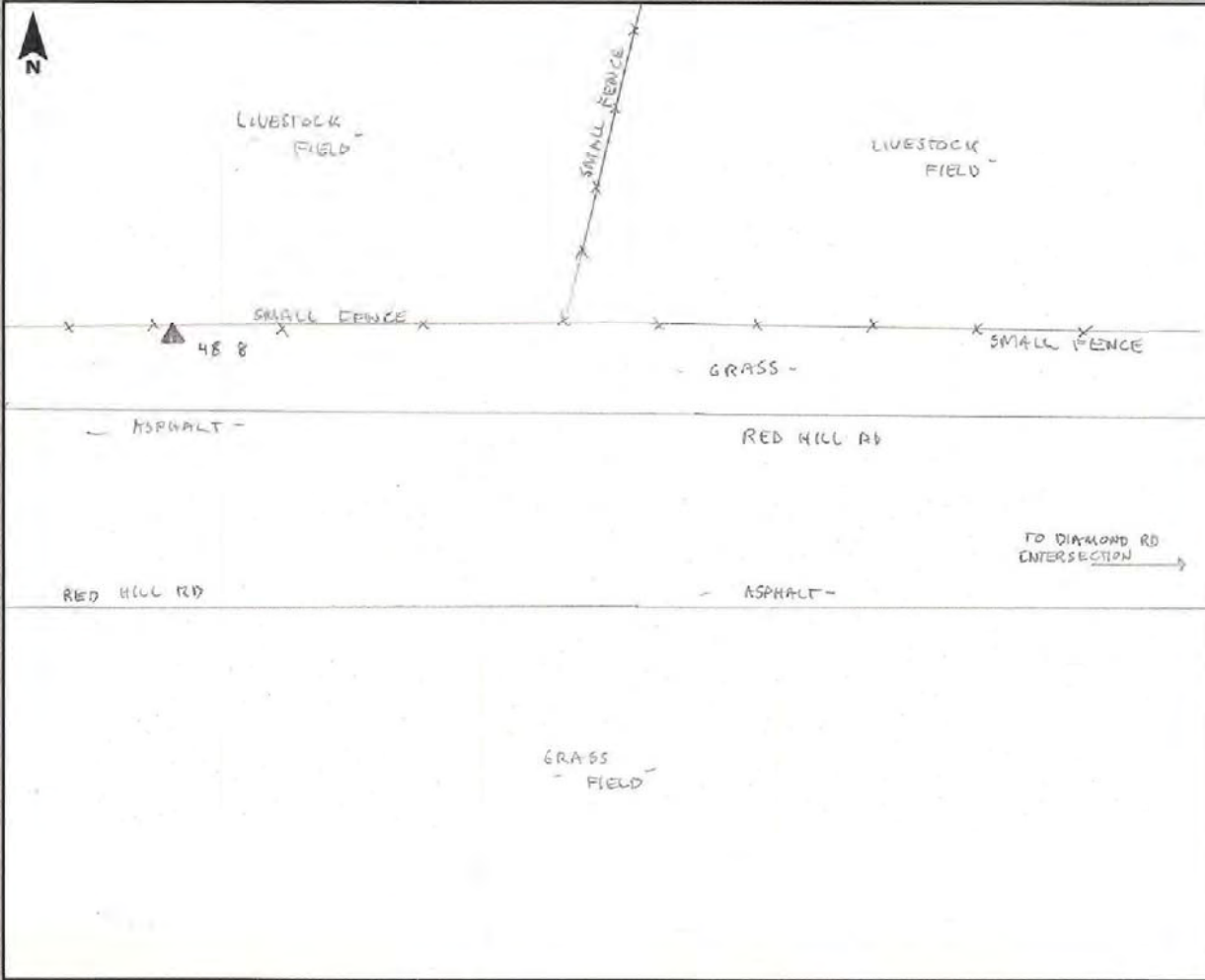


48 13-AA3052-FBN-3N-28MAR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>3/28/2012</u>
Station Name: <u>48 8</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N24°15'22.47"</u>	Julian Day: <u>88</u>	Session No. _____
Longitude: <u>W86°25'31.47"</u>	Start Time: <u>14:23</u>	End Time: <u>16:27</u>
Ellip. Height: <u>174.1 m</u>	Data File Name: <u>77790881</u>	
Type of Mark: <u>NGS mark</u>	Type of Receiver: <u>5800 #7779</u>	
Stamping on Mark: <u>48-8 1993</u>	Type of Antenna: <u>5800 #7779</u>	
Weather Condition: <u>Partly Cloudy ~ 72°</u>	Antenna Height: <u>2.00 m</u>	to bottom of antenna mount





48 8-AA3047-1-28MAR2012



48 8-AA3047-2-28MAR2012



48 8-AA3047-3N-28MAR2012



48 8-AA3047-3W-28MAR2012



48 8-AA3047-3E-28MAR2012

GPS Observation Log Sheet



Project Name: <u>Jackson, Marshall and DeKalb Counties, AL</u>	Project Number: <u>71899</u>	Survey Date: <u>3/31/12</u>
Station Name: <u>K 476</u>	Operator Name: <u>Josh Nave</u>	
Latitude: <u>N34-41-11.246</u>	Julian Day: <u>091</u>	Session No. <u>BASE</u>
Longitude: <u>W86-06-00.755</u>	Start Time: <u>8:32 AM</u>	End Time: <u>4:11 PM</u>
Ellip. Height: <u>559.77 FT</u>	Data File Name: <u>K476091A</u>	
Type of Mark: <u>DISK IN BED ROCK</u>	Type of Receiver: <u>Trimble 4000SS I</u>	
Stamping on Mark: <u>K 476 1988</u>	Type of Antenna: <u>Trimble M/C 21/22</u>	
Weather Condition: _____	Antenna Height: <u>6.562 FT</u>	<small>to bottom of antenna mount</small>





K 476-EF1323-1-31MAR2012



K 476-EF1323-2-31MAR2012



K 476-EF1323-3N-31MAR2012



K 476-EF1323-3E-31MAR2012



K 476-EF1323-3S-31MAR2012

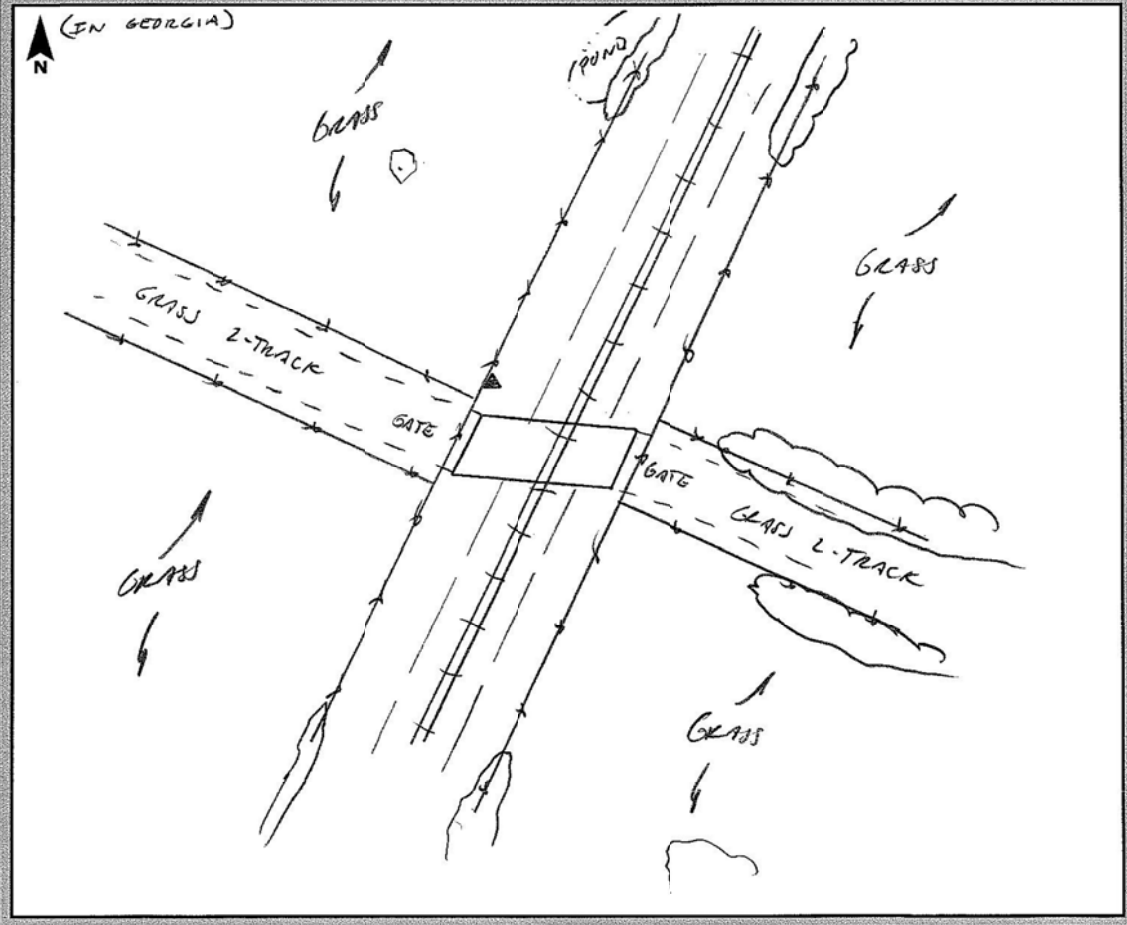


K 476-EF1323-3W-31MAR2012

GPS Observation Log Sheet



Project Name: LIDAR QC ALA - 3 County Project Number: 71899 Survey Date: 4-3-12
Station Name: Q120 (EE0921) Operator Name: J SPEELMAN
Latitude: 34° 41' 56.57" Julian Day: 094 Session No. 1
Longitude: 85° 32' 04.09" Start Time: 4:24 End Time: 4:59
Ellip. Height: 732.059' Data File Name: BB100
Type of Mark: BRASS NAIL in Conc. Type of Receiver: TRIMBLE R9-2 (4208128810)
Stamping on Mark: Q120 1934 Type of Antenna: INTERNAL
Weather Condition: PC 83° Antenna Height: 2.0 m to bottom of antenna mount





Q 120-EE0971-BM-1-03APR2012



Q 120-EE0971-BM-2-03APR2012



Q 120-EE0971-BM-3NE-03APR2012



Q 120-EE0971-BM-3SW-03APR2012



Q 120-EE0971-BM-3NW-03APR2012

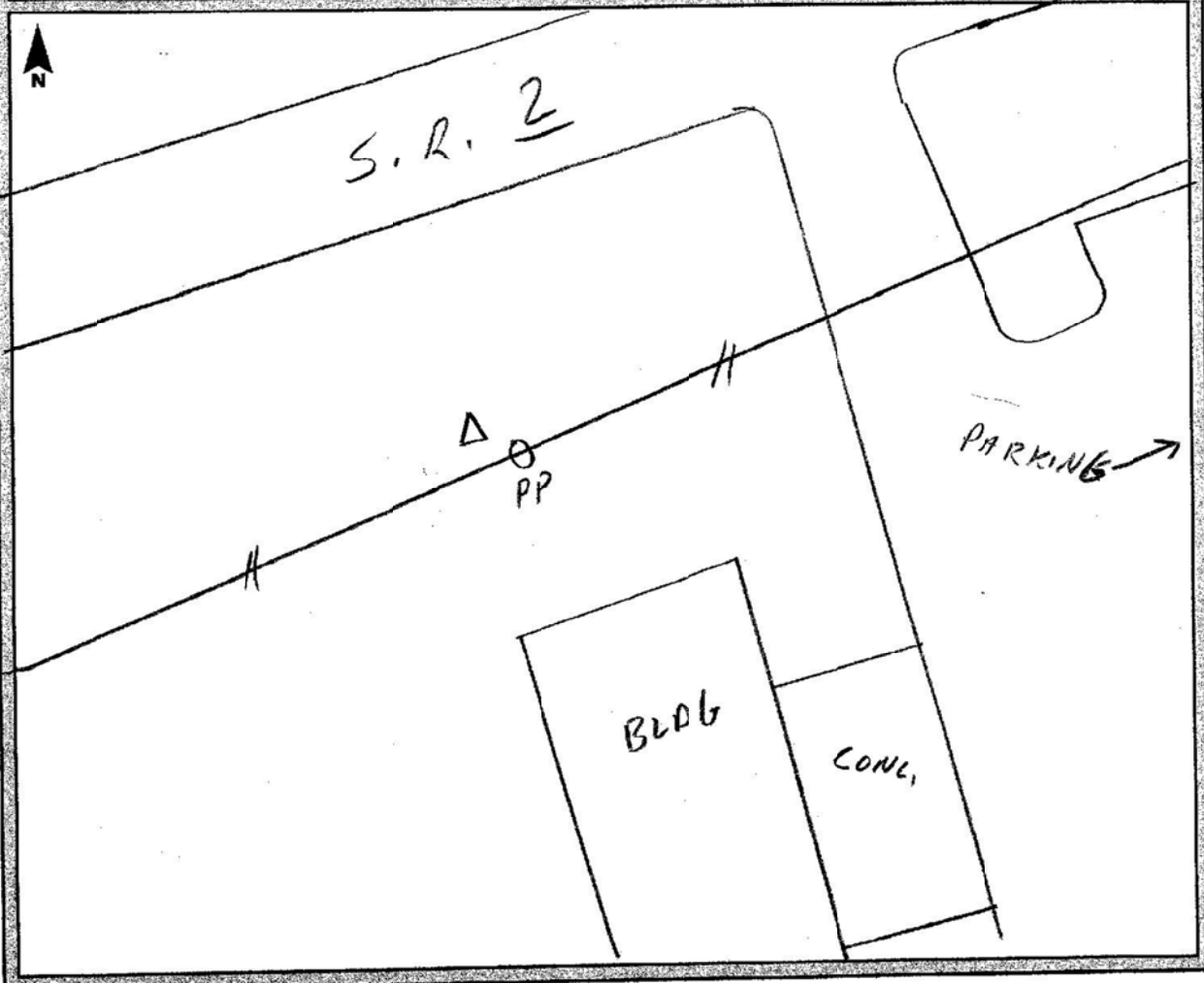


Q 120-EE0971-BM-3SE-03APR2012

GPS Observation Log Sheet



Project Name: Jackson, Marshall and DeKalb Counties, AL	Project Number: 71899	Survey Date: 4/3/12
Station Name: X 479	Operator Name: Josh Nave	
Latitude: N34-54-49.687	Julian Day: 094	Session No. BASE
Longitude: W85-46-24.329	Start Time: 8:39 AM	End Time: 6:17 PM
Ellip. Height: 528.61 FT	Data File Name: X479094A	
Type of Mark: SS ROD	Type of Receiver: Trimble 400055E	
Stamping on Mark: X 479 1983	Type of Antenna: Trimble M/L L1/L2	
Weather Condition:	Antenna Height: 6.562 FT to bottom of antenna mount	





X 479-EE1500-1-03APR2012



X 479-EE1500-2-03APR2012



X 479-EE1500-3E-03APR2012



X 479-EE1500-3W-03APR2012



X 479-EE1500-3N-03APR2012

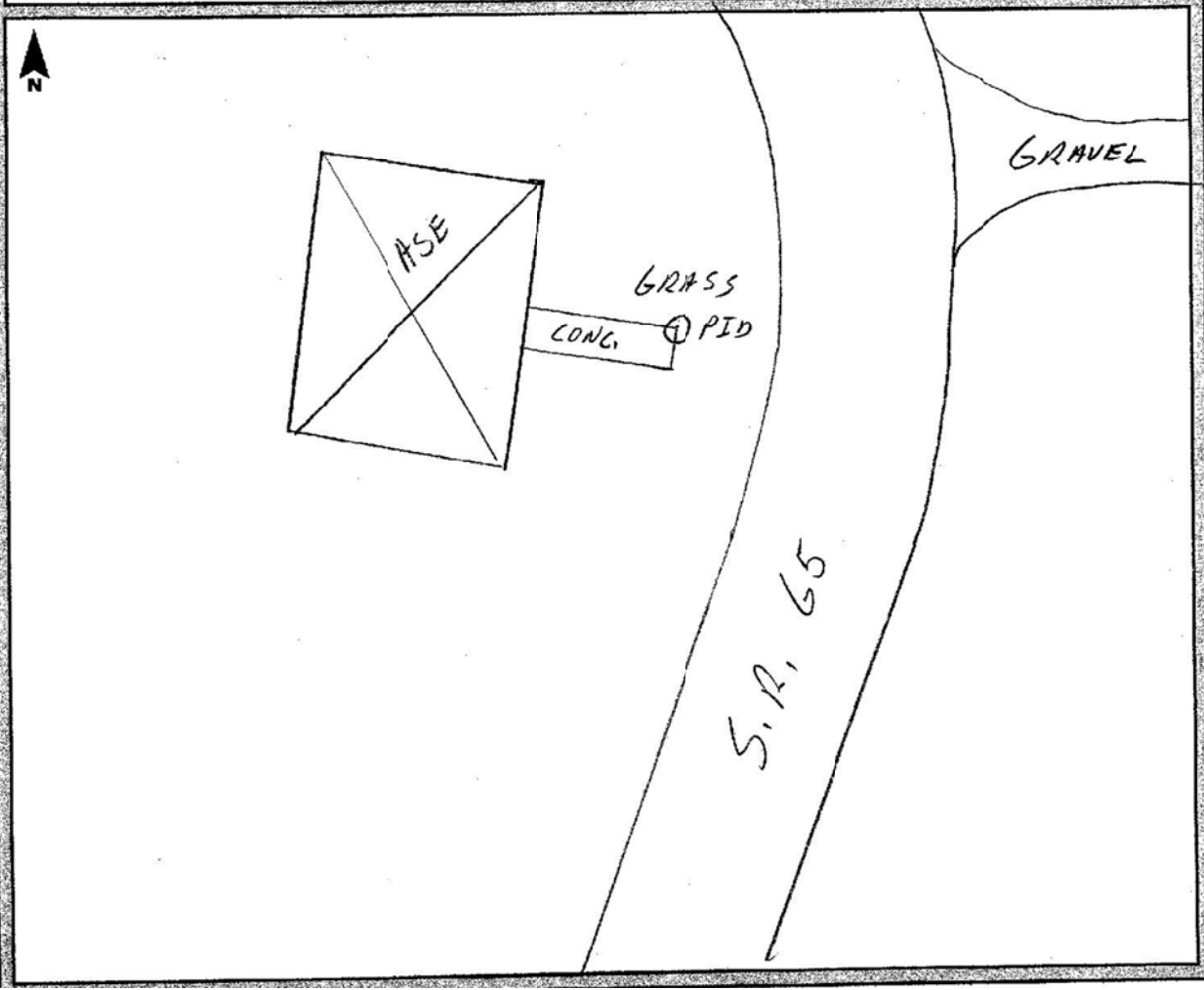


X 479-EE1500-3S-03APR2012

GPS Observation Log Sheet



Project Name: <u>Jackson, Marshall and DeKalb Counties, AL</u>	Project Number: <u>71899</u>	Survey Date: <u>4/1/12</u>
Station Name: <u>1001</u>	Operator Name: <u>Josh Nave</u>	
Latitude: <u>N 34-54-30.044</u>	Julian Day: <u>092</u>	Session No. <u>ROVER</u>
Longitude: <u>W 86-12-54.755</u>	Start Time: <u>11:39 AM</u>	End Time: <u>11:05 AM</u>
Ellip. Height: <u>577.504 FT</u>	Data File Name: <u>59340920.dat</u>	
Type of Mark: <u>PID</u>	Type of Receiver: <u>Trimble R82</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>Trimble R82</u>	
Weather Condition: _____	Antenna Height: <u>6.89 FT</u> to bottom of antenna mount	





1001-2-31MAR2012



1001-3S-31MAR2012

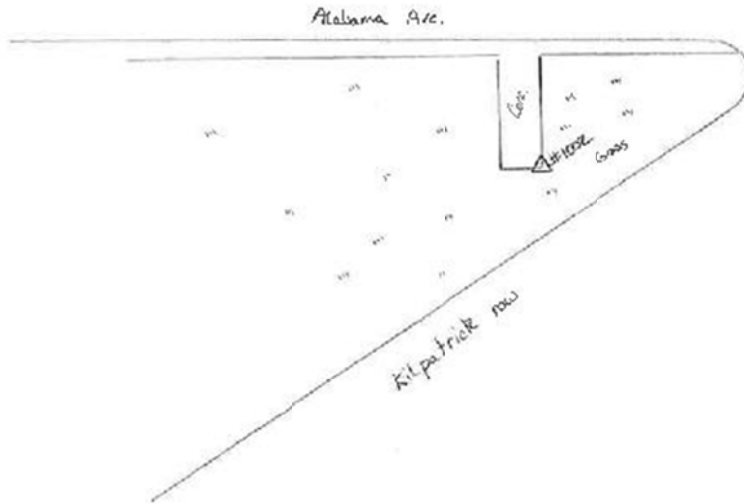


1001-3W-31MAR2012

GPS Observation Log Sheet



Project Name: Jackson, Marshall, and DeKalb Co., AL **Project Number:** 71899 **Survey Date:** 4/4/12
Station Name: 1002 **Operator Name:** r. Josh Nave
Latitude: N 34 56 50.7 **Julian Day:** 095 **Session No.:** N/A
Longitude: W 85 42 49.2 **Start Time:** RTK **End Time:** RTK
Ellip. Height: 560.7 **Data File Name:** _____
Type of Mark: P.I.D. - Conc. Corner / Street Cross **Type of Receiver:** R8-2
Stamping on Mark: N/A **Type of Antenna:** R8-2
Weather Condition: Sunny **Antenna Height:** 1.0m to bottom of antenna mount





1002-2-04APR2012



1002-3W-04APR2012

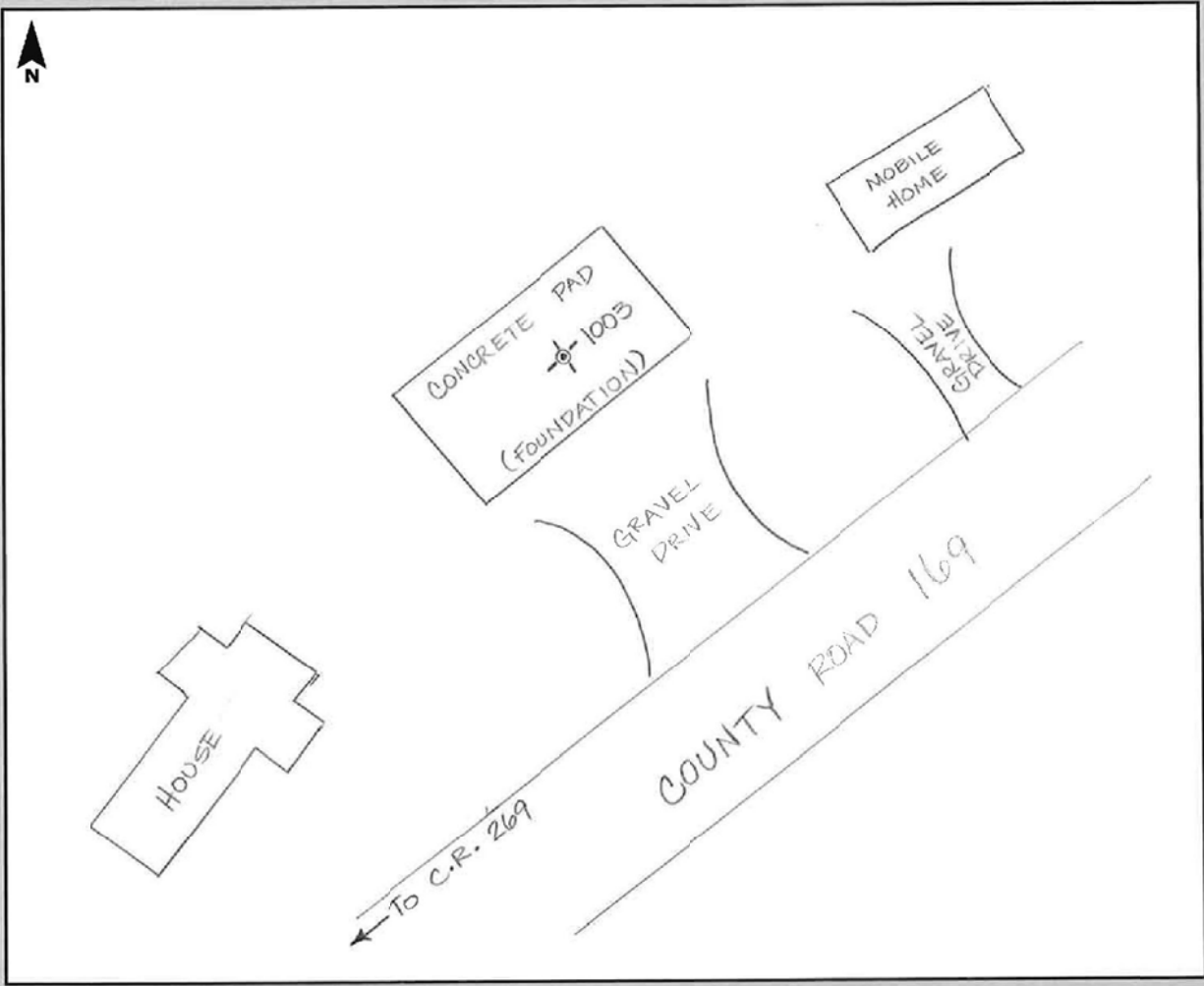


1002-3N-04APR2012

GPS Observation Log Sheet



Project Name: <u>AL LIDAR - Jackson Marshall DeKalb</u>	Project Number: <u>071899</u>	Survey Date: <u>04 APR 2012</u>
Station Name: <u>1003</u>	Operator Name: <u>KELLEE HARGIS</u>	
Latitude: <u>34° 50' 54.84394"</u>	Julian Day: <u>95</u>	Session No. _____
Longitude: <u>85° 35' 50.79999"</u>	Start Time: <u>1:02 PM</u>	End Time: <u>1:05 PM</u>
Ellip. Height: <u>392.450m</u>	Data File Name: <u>AL-LIDAR_95-CJS</u>	
Type of Mark: <u>CONCRETE FOUNDATION</u>	Type of Receiver: <u>TRIMBLE</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>R8-3</u>	
Weather Condition: <u>FAIR / SUNNY 80° F</u>	Antenna Height: <u>2.000m</u>	to bottom of antenna mount





1003-3-04APR2012



1003-3NW-04APR2012

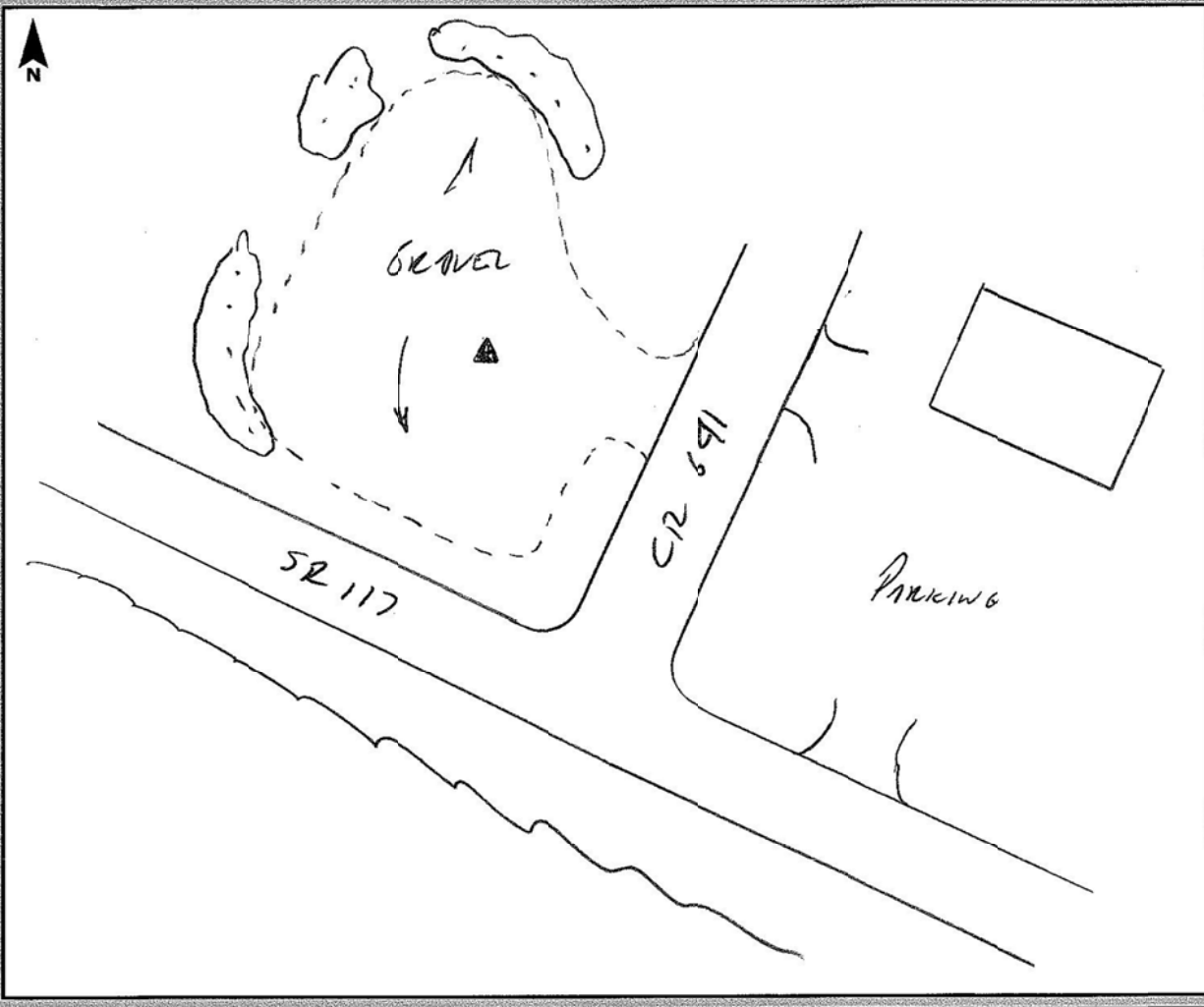


1003-3NE-04APR2012

GPS Observation Log Sheet



Project Name: <u>LIDAR GC - ALA 3 COUNTY</u>	Project Number: <u>71899</u>	Survey Date: <u>9-3-12</u>
Station Name: <u>1004</u>	Operator Name: <u>J SPOEDMAN</u>	
Latitude: <u>79° 33' 33.10"</u>	Julian Day: <u>094</u>	Session No. _____
Longitude: <u>85° 33' 00.72"</u>	Start Time: <u>6:17</u>	End Time: <u>7:00</u>
Ellip. Height: <u>1532.485'</u>	Data File Name: <u>88100993.DAT</u>	
Type of Mark: <u>PAINT MARK</u>	Type of Receiver: <u>TRIMBLE RB-2</u>	
Stamping on Mark: <u>—</u>	Type of Antenna: <u>INTERNAL</u>	
Weather Condition: <u>PC 90°</u>	Antenna Height: <u>2.0m</u>	to bottom of antenna mount





1004-2-03APR2012



1004-3NE-03APR2012

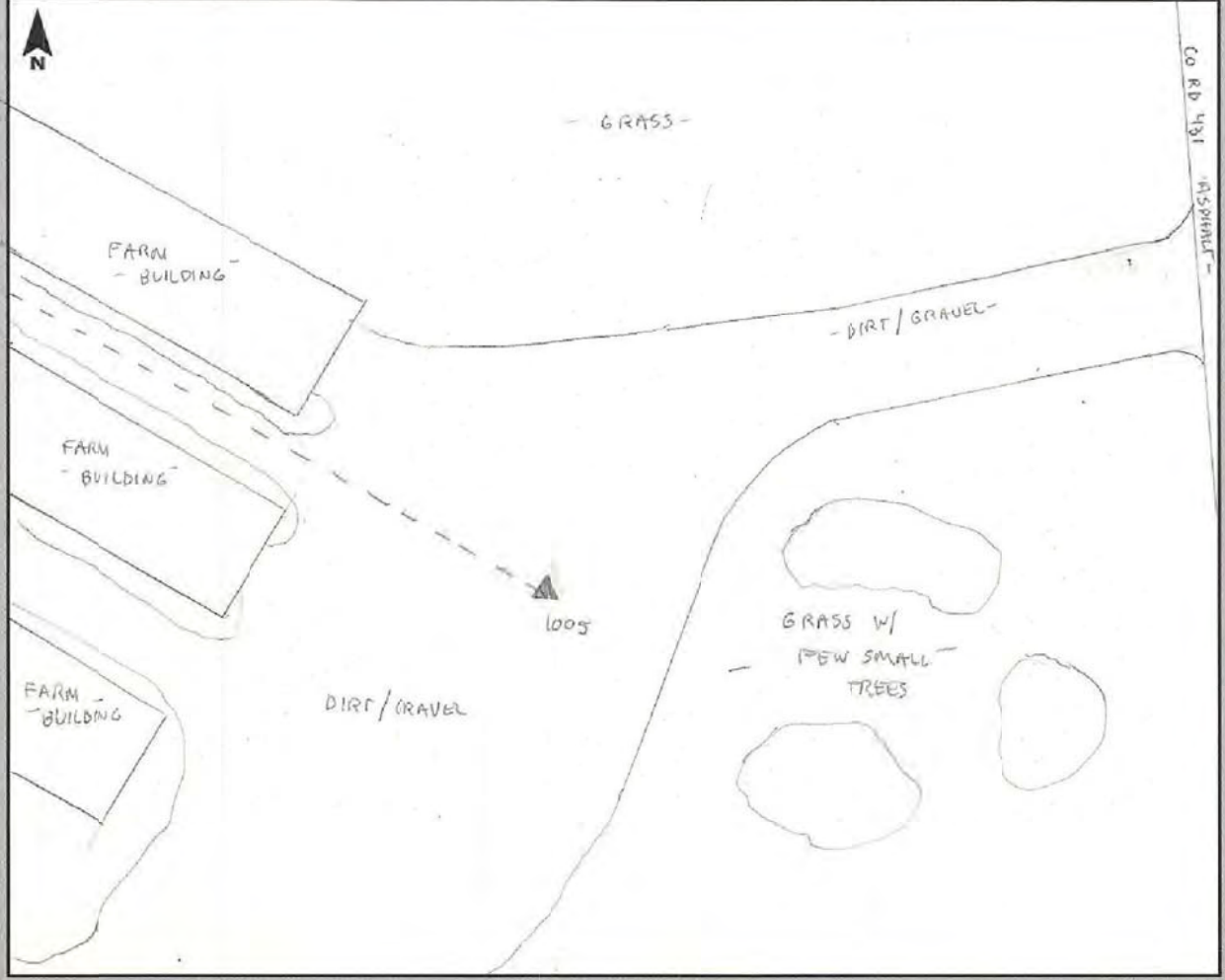


1004-3SE-03APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>3/29/2012</u>
Station Name: <u>1005</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N34° 12' 20.10"</u>	Julian Day: <u>89</u>	Session No. <u>01/A</u>
Longitude: <u>W86° 06' 10.16"</u>	Start Time: <u>12:11</u>	End Time: <u>12:16</u>
Ellip. Height: <u>295.781 m</u>	Data File Name: <u>AL-LIDAR_89_C55</u>	
Type of Mark: <u>Nail w/ ribbon</u>	Type of Receiver: <u>RE-3 #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>RE-3 #0364</u>	
Weather Condition: <u>Partly Cloudy ~ 74°</u>	Antenna Height: <u>2.00 m</u>	to bottom of antenna mount





1005-2-29MAR2012



1005-3N-29MAR2012

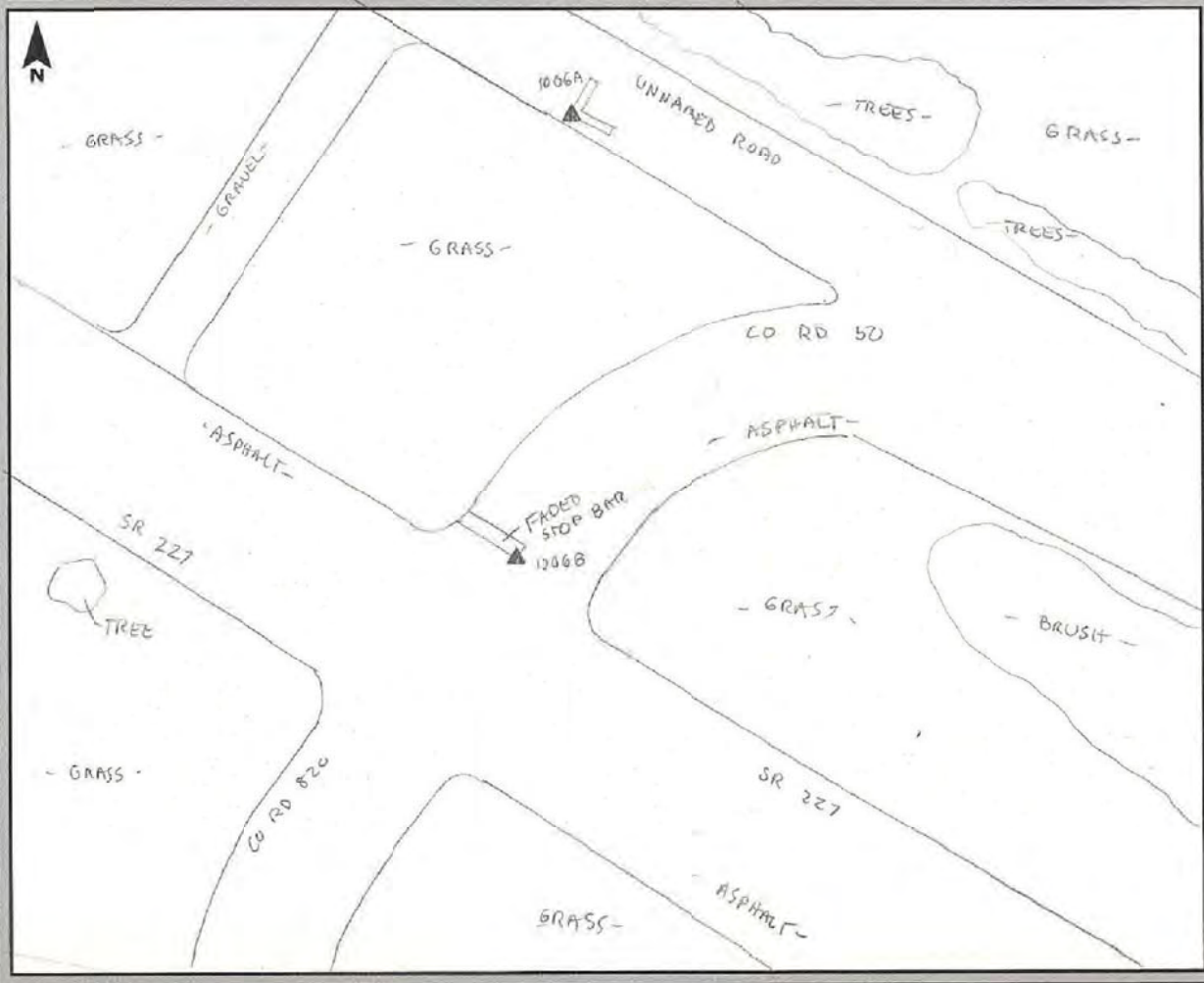


1005-3W-29MAR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>4/2/2012</u>
Station Name: <u>1006A / 1006B</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N34°26'40.56" / N34°26'39.13"</u>	Julian Day: <u>93</u>	Session No. <u>N/A</u>
Longitude: <u>W86°05'17.75" / W86°05'17.42"</u>	Start Time: <u>13:27 / 13:35</u>	End Time: <u>13:27 / 13:40</u>
Ellip. Height: <u>322.3 m / 325.0</u>	Data File Name: <u>AL_LIDAR_93_CJS</u>	
Type of Mark: <u>Mug nails</u>	Type of Receiver: <u>RS-3 #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>RS-3 #0364</u>	
Weather Condition: <u>Partly Cloudy @ 79°</u>	Antenna Height: <u>2.00 m</u>	to bottom of antenna mount





1006A-2-02APR2012



1006A-3SW-02APR2012



1006A-3NW-02APR2012



1006B-2-02APR2012



1006B-3SE-02APR2012

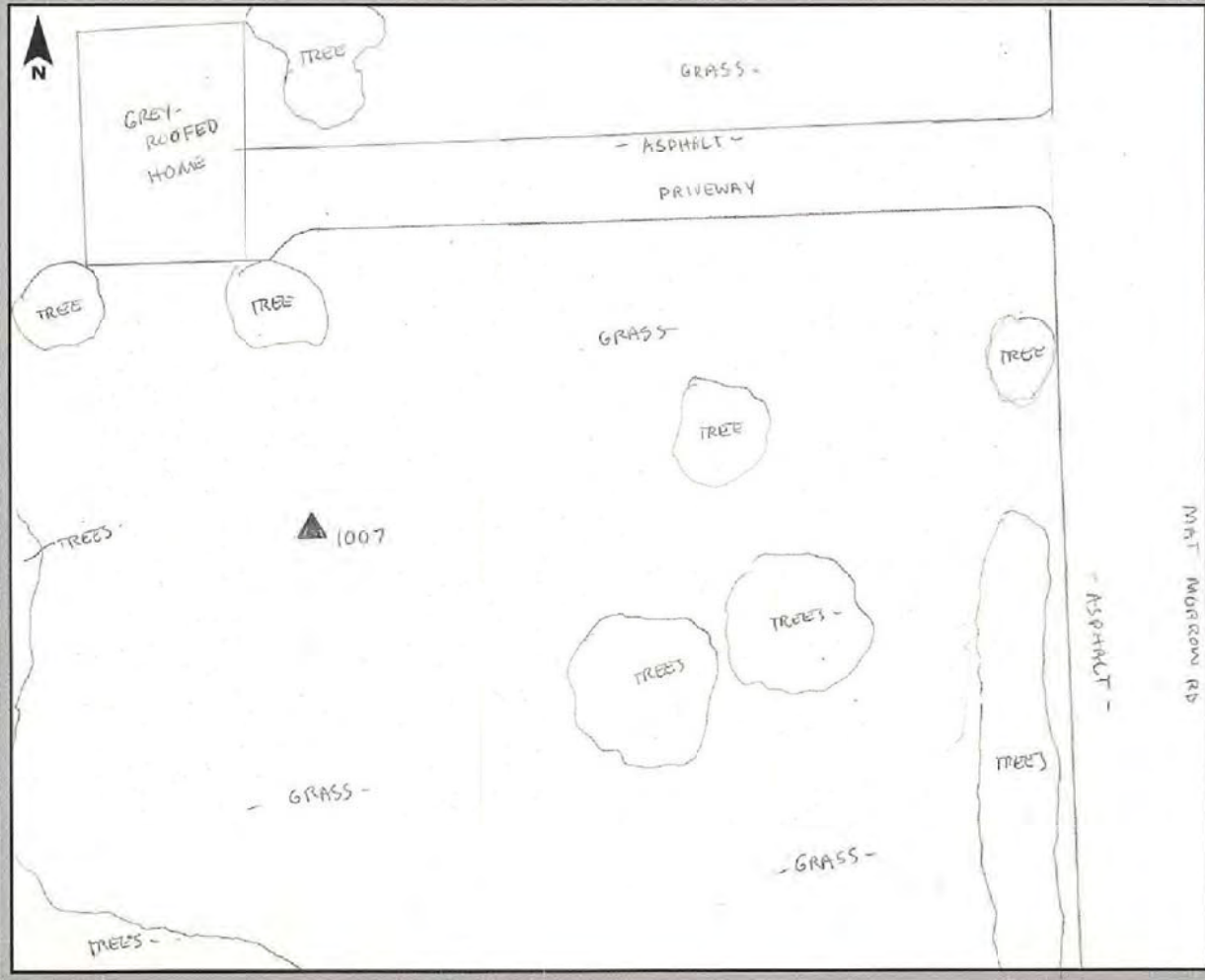


1006B-3SW-02APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>3/31/2012</u>
Station Name: <u>1007</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N134° 18' 50.28"</u>	Julian Day: <u>91</u>	Session No. <u>N/A</u>
Longitude: <u>W86° 54' 13.97"</u>	Start Time: <u>10:38</u>	End Time: <u>10:43</u>
Ellip. Height: <u>301.5m</u>	Data File Name: <u>AL-LIDAR-91-CJS</u>	
Type of Mark: <u>N/A</u>	Type of Receiver: <u>R8-3 #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>R8-3 #0364</u>	
Weather Condition: <u>Mostly cloudy ~68°</u>	Antenna Height: <u>2.00m</u>	to bottom of antenna mount





1007-2-31MAR2012



1007-3N-31MAR2012

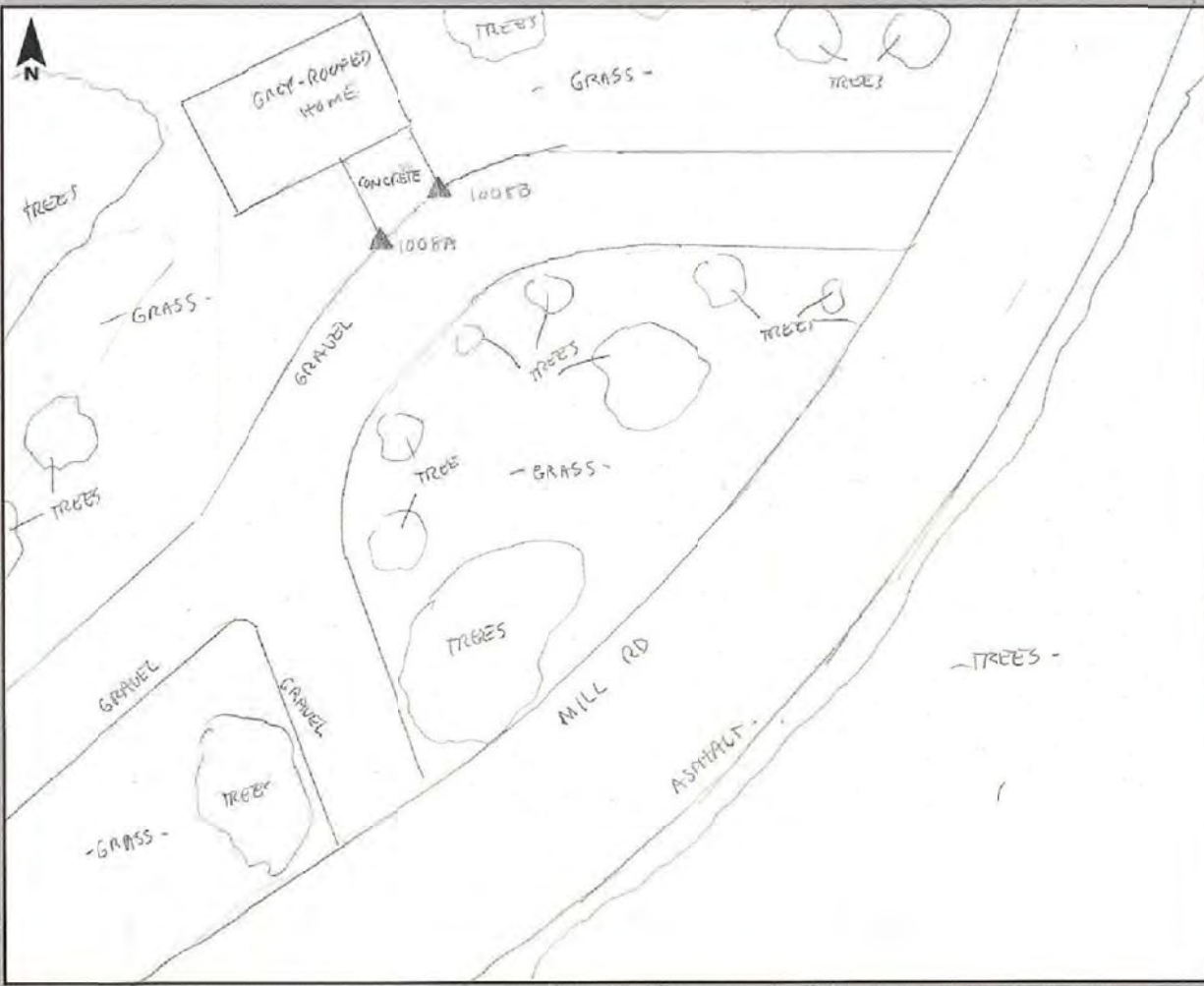


1007-3W-31MAR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>4/1/2012</u>
Station Name: <u>1008A/1008B</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N34° 35' 37.32" / N34° 35' 37.43"</u>	Julian Day: <u>92</u>	Session No. <u>N/A</u>
Longitude: <u>W86° 16' 22.00" / W86° 16' 21.67"</u>	Start Time: <u>10:10/10:16</u>	End Time: <u>10:15/10:22</u>
Ellip. Height: <u>159.5 m / 159.6 m</u>	Data File Name: <u>AL-LIDAR-92-035</u>	
Type of Mark: <u>Marked points</u>	Type of Receiver: <u>R8-3 #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>R8-3 #0364</u>	
Weather Condition: <u>Partly Cloudy 27°C</u>	Antenna Height: <u>2.00 m</u> to bottom of antenna mount	





1008A-2-01APR2012



1008A-3SE-01APR2012



1008A-3NE-01APR2012



1008B-2-01APR2012



1008B-3N-01APR2012

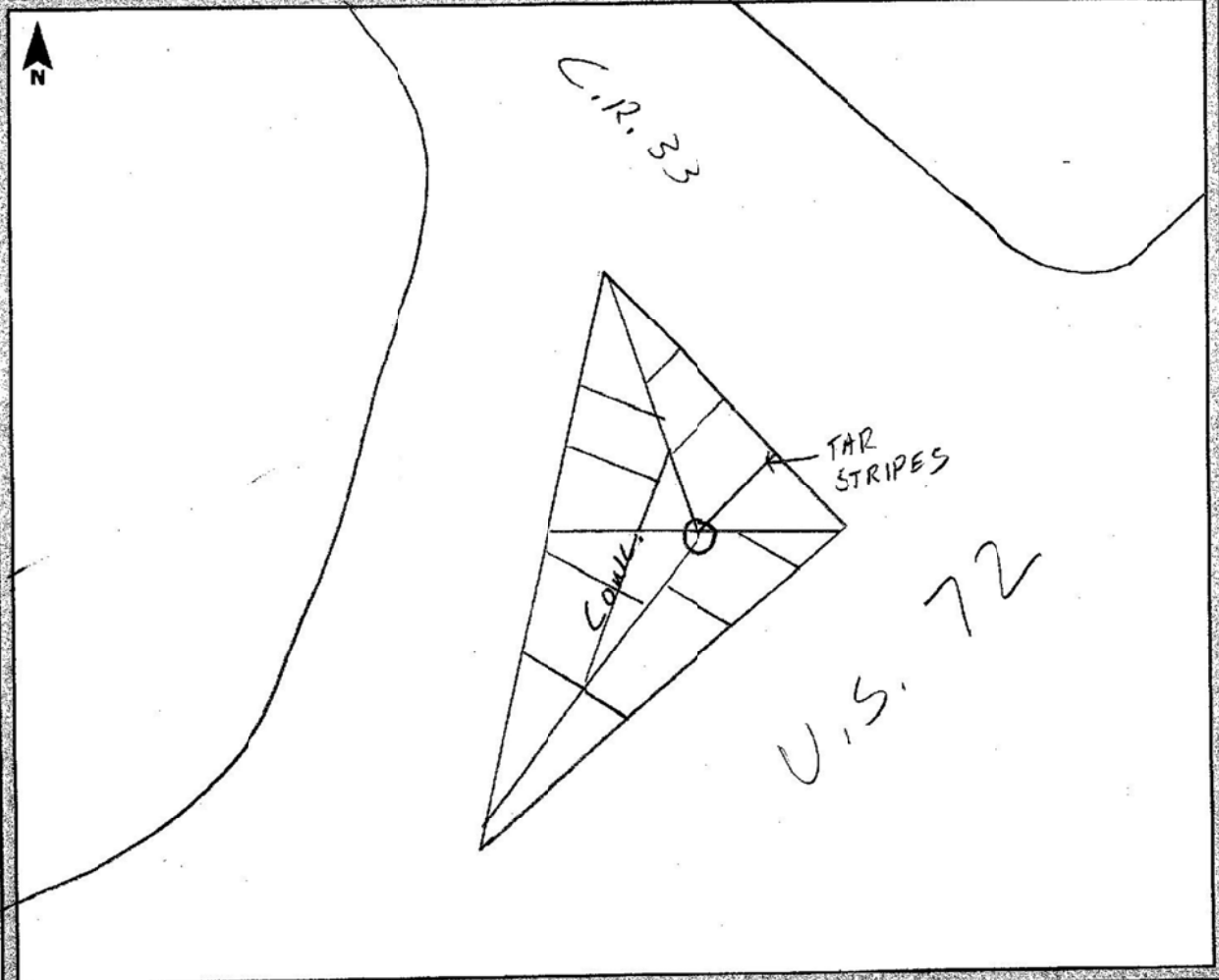


1008B-3E-01APR2012

GPS Observation Log Sheet



Project Name: <u>Jackson, Marshall and DeKalb Counties, AL</u>	Project Number: <u>71899</u>	Survey Date: <u>4/2/12</u>
Station Name: <u>1009</u>	Operator Name: <u>Josh Nave</u>	
Latitude: <u>N 34-43-07.352</u>	Julian Day: <u>093</u>	Session No. <u>ROVER</u>
Longitude: <u>W 85-57-29.525</u>	Start Time: <u>4:09 PM</u>	End Time: <u>5:48 PM</u>
Ellip. Height: <u>540.35 FT</u>	Data File Name: <u>1009093A</u>	
Type of Mark: <u>PI D</u>	Type of Receiver: <u>Trimble 4000 SS F</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>Trimble M/L L1/L2</u>	
Weather Condition: _____	Antenna Height: <u>5.906 FT</u>	to bottom of antenna mount





1009-2-02APR2012



1009-3NW-02APR2012

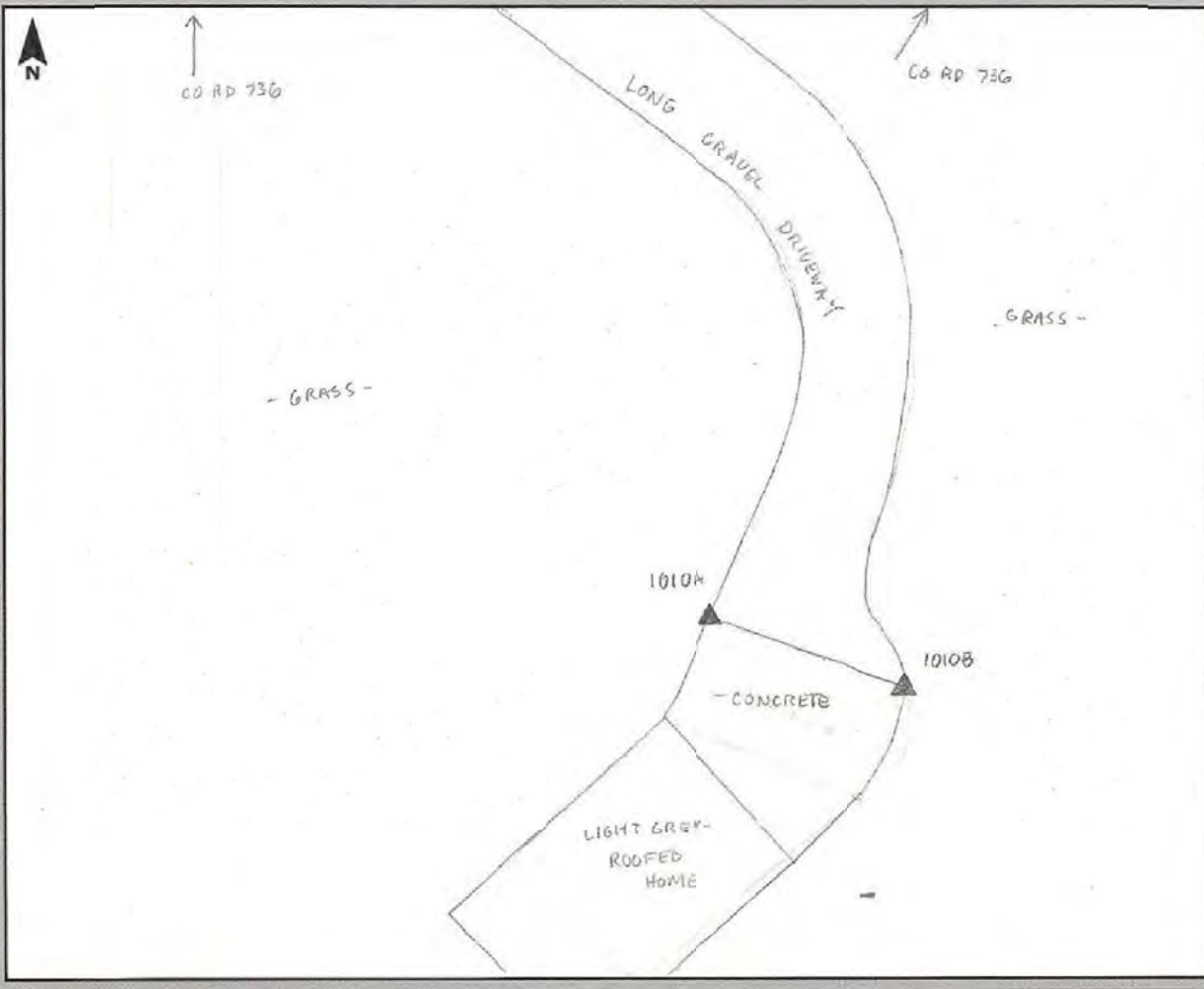


1009-3SW-02APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>4/3/2012</u>
Station Name: <u>1010A / 1010B</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N34°16'15.63" / N34°16'15.40"</u>	Julian Day: <u>94</u>	Session No. <u>N/A</u>
Longitude: <u>W85°45'57.72" / W85°45'57.19"</u>	Start Time: <u>18:03 / 18:08</u>	End Time: <u>18:07 / 18:13</u>
Ellip. Height: <u>317.4 m / 316.8 m</u>	Data File Name: <u>AL-LIDAR-94-CJS</u>	
Type of Mark: <u>Marked points</u>	Type of Receiver: <u>R8-3 #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>R8-3 #0364</u>	
Weather Condition: <u>Partly Cloudy ~ 78°</u>	Antenna Height: <u>2.00 m</u>	to bottom of antenna mount





1010A-2-03APR2012



1010A-3SW-03APR2012



1010A-3SE-03APR2012



1010B-2-03APR2012



1010B-3SW-03APR2012

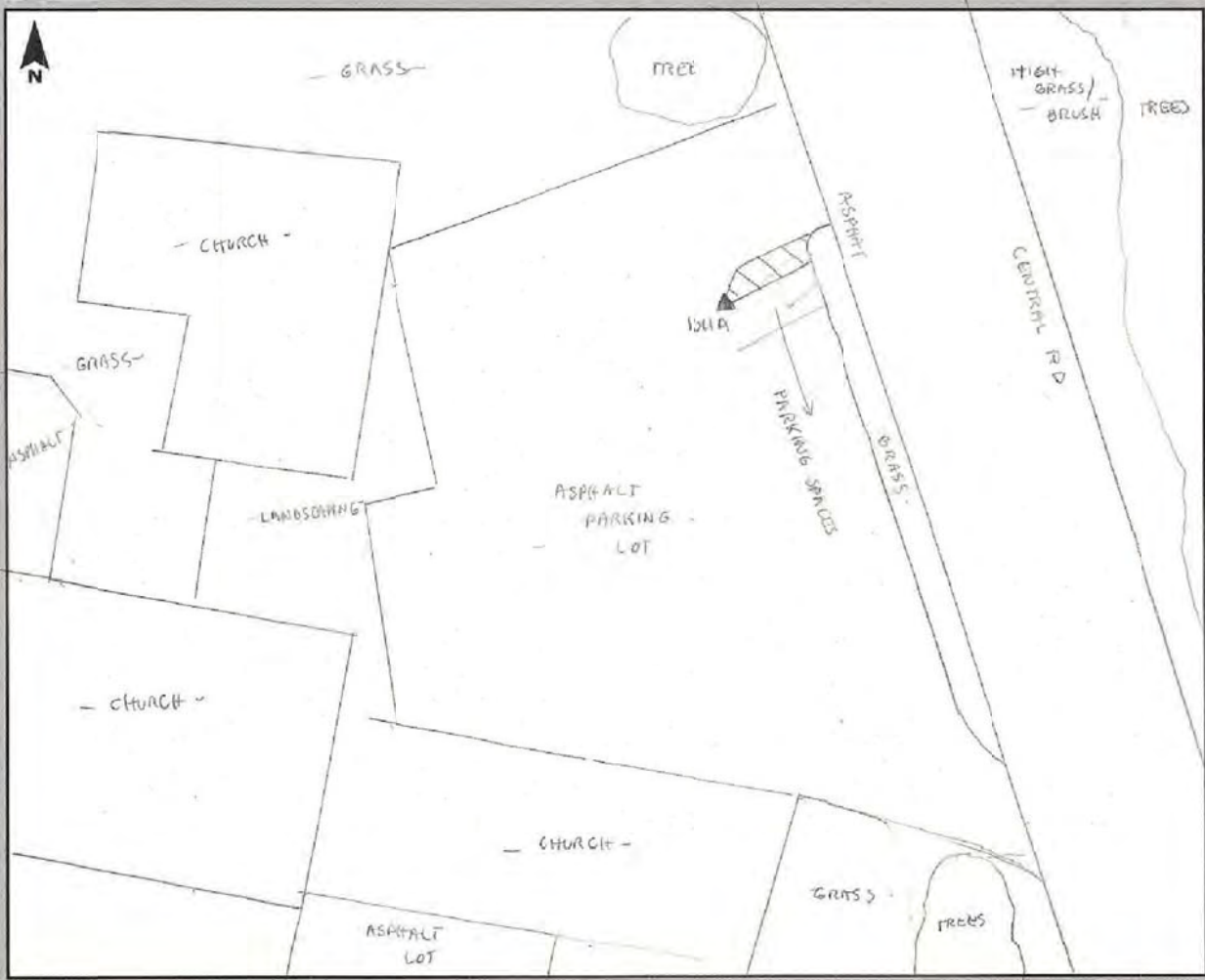


1010B-3SE-03APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71809</u>	Survey Date: <u>4/3/2012</u>
Station Name: <u>1061A</u>	Operator Name: <u>Pody Schneider</u>	
Latitude: <u>N34° 38' 16.12"</u>	Julian Day: <u>94</u>	Session No. <u>N/A</u>
Longitude: <u>W85° 46' 10.96"</u>	Start Time: <u>13:29</u>	End Time: <u>13:34</u>
Ellip. Height: <u>410.1 m</u>	Data File Name: <u>AL_LIDAR_94_CJS</u>	
Type of Mark: <u>Mag Nail</u>	Type of Receiver: <u>R8-S #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>R8-S #0364</u>	
Weather Condition: <u>Partly Cloudy ~80°</u>	Antenna Height: <u>2.00 m</u>	to bottom of antenna mount





1011A-2-03APR2012



1011A-3N-03APR2012

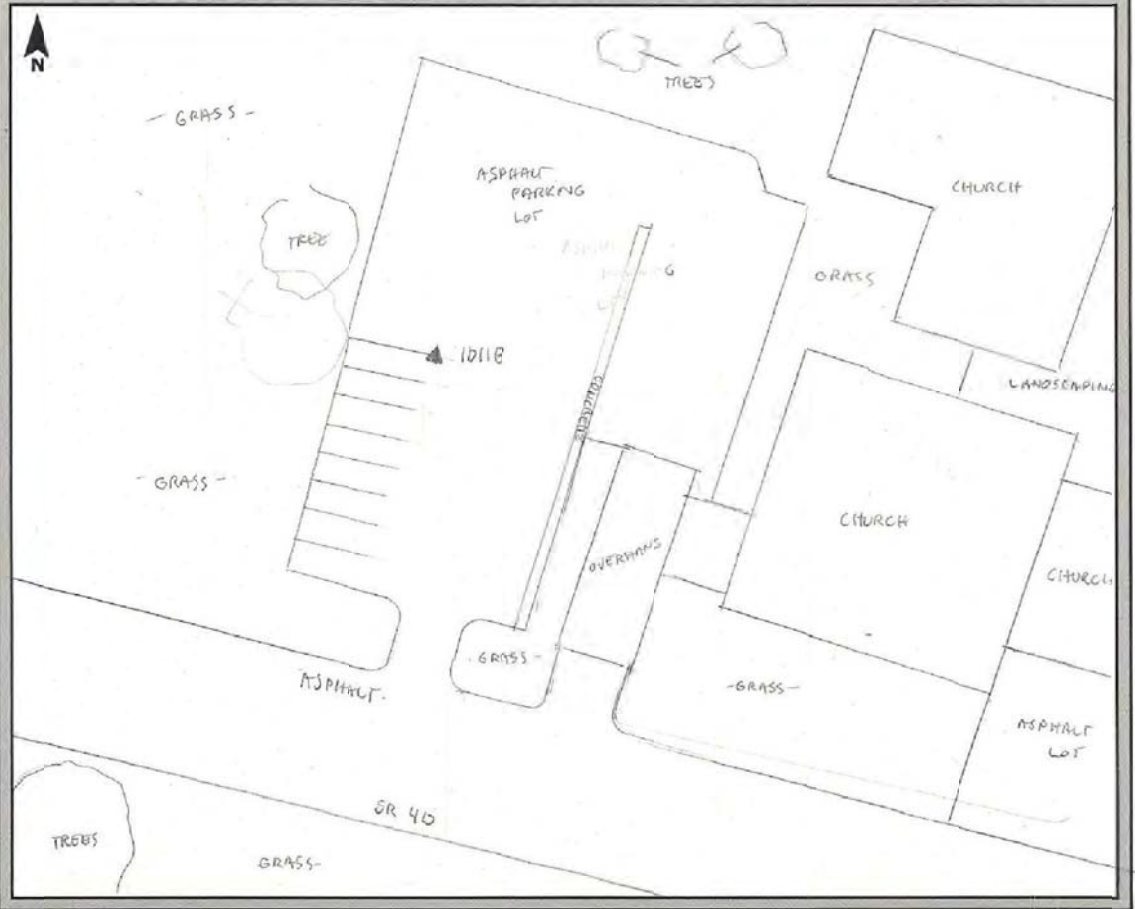


1011A-3E-03APR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u> Survey Date: <u>4/3/2012</u>
Station Name: <u>1011B</u>	Operator Name: <u>Cody Schneider</u>
Latitude: <u>N34° 38' 14.55"</u>	Julian Day: <u>94</u> Session No. <u>N/A</u>
Longitude: <u>W85° 46' 15.61"</u>	Start Time: <u>13:40</u> End Time: <u>13:45</u>
Ellip. Height: <u>410.9 m</u>	Data File Name: <u>AL-LIDAR-94-CJS</u>
Type of Mark: <u>Mag Nail</u>	Type of Receiver: <u>RE-3 #0364</u>
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>RE-3 #0364</u>
Weather Condition: <u>Partly Cloudy ~ 80°</u>	Antenna Height: <u>2.00m</u> to bottom of antenna mount





1011B-2-03APR2012



1011B-3W-03APR2012

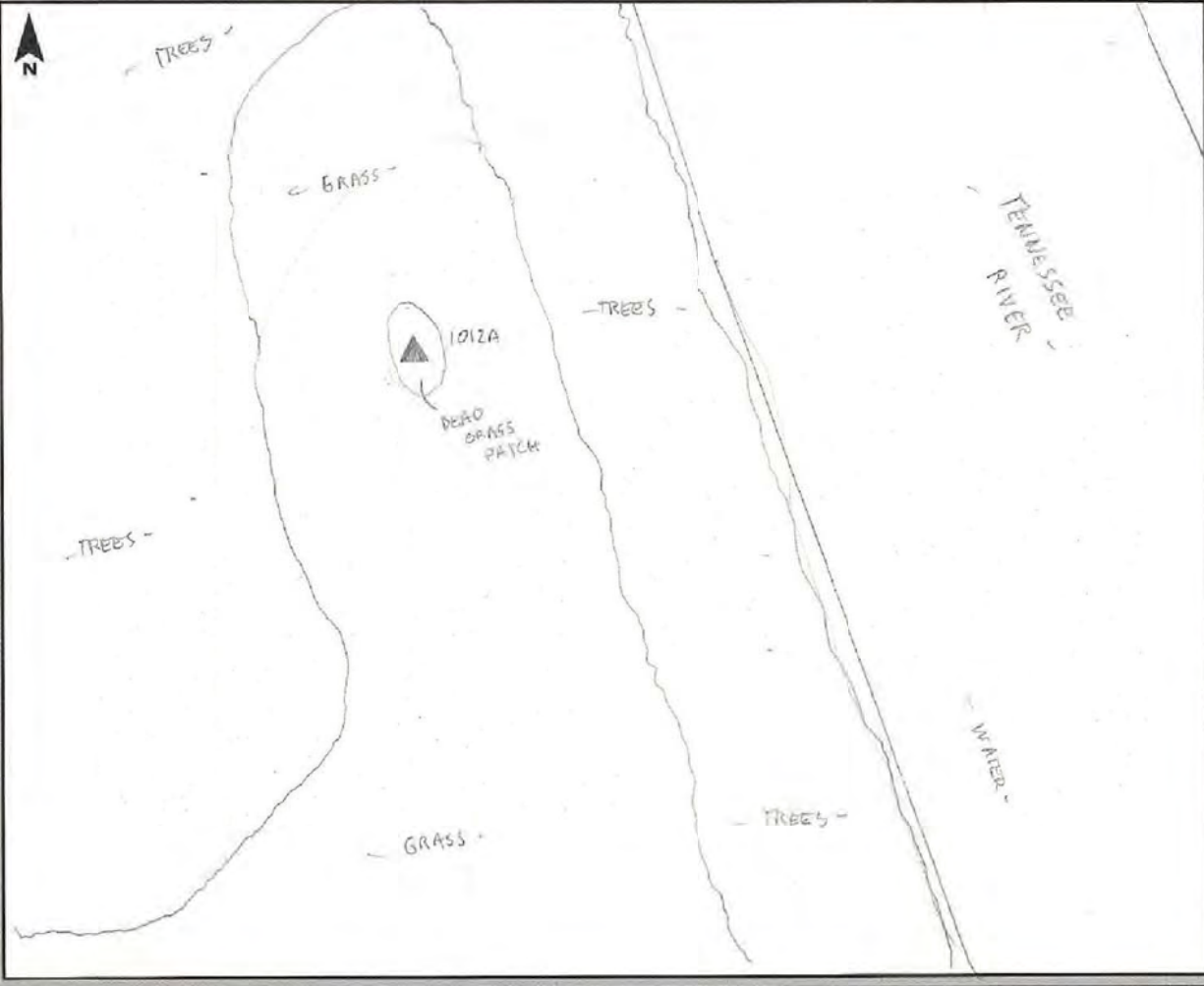


1011B-3S-03APR2012

GPS Observation Log Sheet



Project Name:	5 Co AL LIDAR	Project Number:	71899	Survey Date:	3/2/2012		
Station Name:	1012A	Operator Name:	Cody Schneider	Julian Day:	91	Session No.	N/A
Latitude:	N34°31'35.10"	Start Time:	12:57	End Time:	13:02		
Longitude:	W86°32'45.76"	Data File Name:	AL-LIDAR_91_CJS	Type of Receiver:	RS-3 #0364		
Ellip. Height:	144.5 m	Type of Antenna:	RS-3 #0364	Antenna Height:	3.00 m	to bottom of antenna mount	
Type of Mark:	Rebar w/cap	Weather Condition:	Partly Cloudy 72°				
Stamping on Mark:	N/A						





1012A-2-31MAR2012



1012A-3SW-31MAR2012

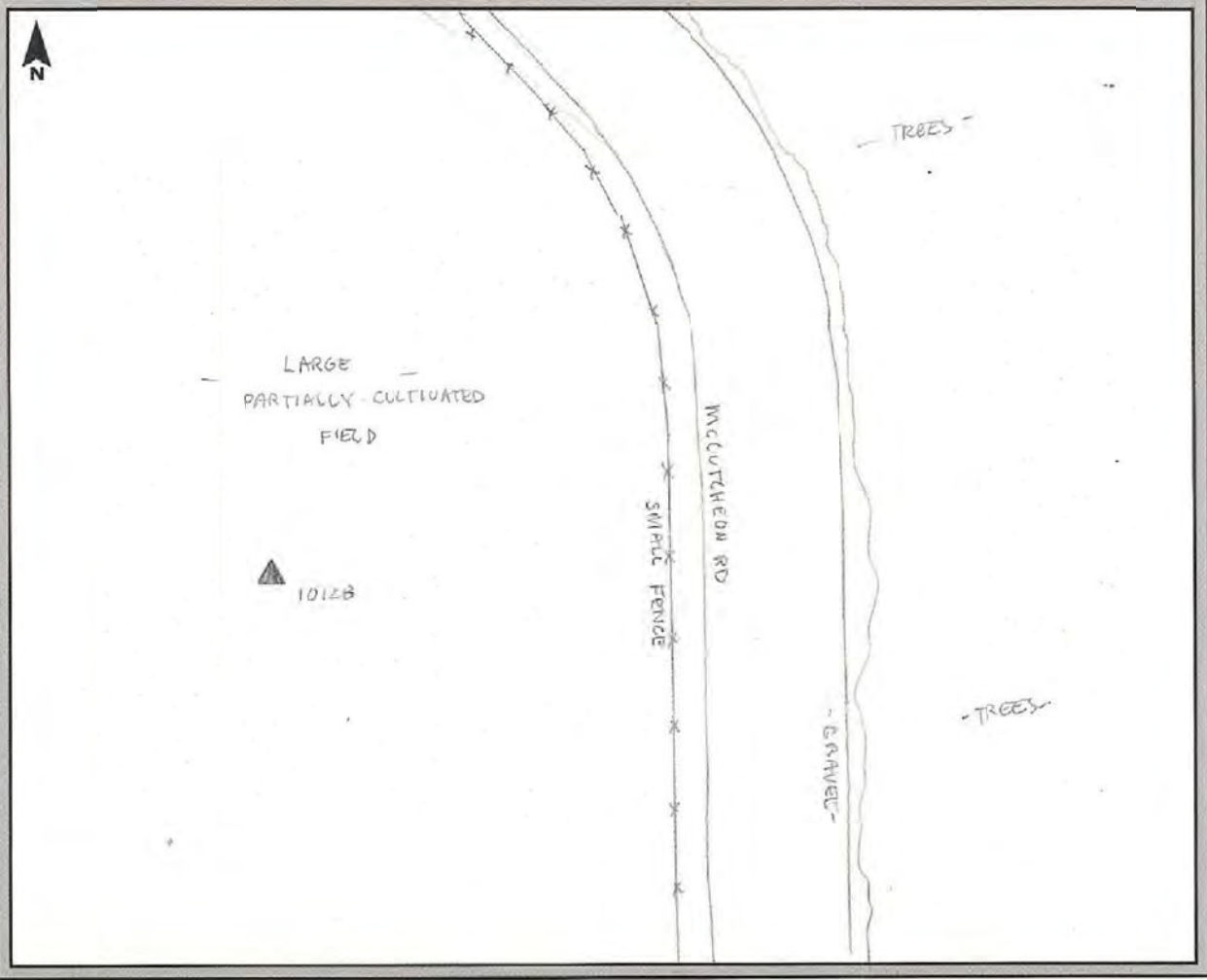


1012A-3NW-31MAR2012

GPS Observation Log Sheet



Project Name:	<u>5 Co AL LIDAR</u>	Project Number:	<u>71849</u>	Survey Date:	<u>3/31/2012</u>
Station Name:	<u>1012B</u>	Operator Name:	<u>Cody Schneider</u>		
Latitude:	<u>N34°31'52.98"</u>	Julian Day:	<u>91</u>	Session No.:	<u>N/A</u>
Longitude:	<u>W86°33'05.11"</u>	Start Time:	<u>13:22</u>	End Time:	<u>13:34</u>
Ellip. Height:	<u>142.8 m</u>	Data File Name:	<u>AL-LIDAR-91.CVS</u>		
Type of Mark:	<u>N/A</u>	Type of Receiver:	<u>RF-3 #0364</u>		
Stamping on Mark:	<u>N/A</u>	Type of Antenna:	<u>RF-3 #0364</u>		
Weather Condition:	<u>Partly Cloudy @ 72°</u>	Antenna Height:	<u>3.00 m</u>	to bottom of antenna mount	





1012B-2-31MAR2012



1012B-3W-31MAR2012

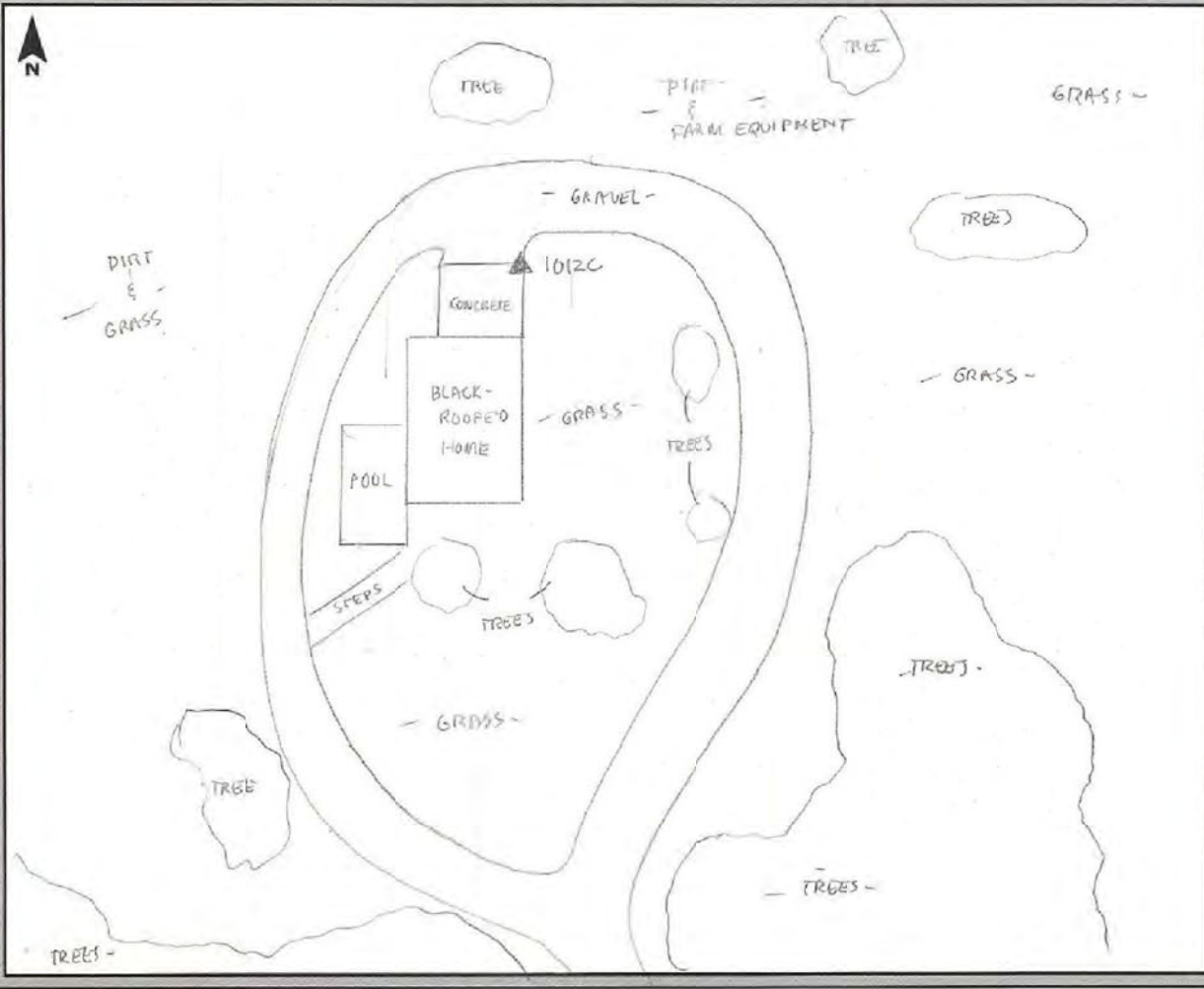


1012B-3S-31MAR2012

GPS Observation Log Sheet



Project Name:	<u>5 Co AL LIDAR</u>	Project Number:	<u>71899</u>	Survey Date:	<u>3/31/2012</u>
Station Name:	<u>1012C</u>	Operator Name:	<u>Cody Schneider</u>	Julian Day:	<u>91</u>
Latitude:	<u>N34° 29' 23.00"</u>	Session No.:	<u>N/A</u>	Start Time:	<u>14:19</u>
Longitude:	<u>W86° 22' 28.30"</u>	End Time:	<u>14:23</u>	Data File Name:	<u>AL-LIDAR-91-CJS</u>
Ellip. Height:	<u>154.7m</u>	Type of Receiver:	<u>R8-3 #0364</u>	Type of Antenna:	<u>R8-3 #0364</u>
Type of Mark:	<u>Marked point</u>	Antenna Height:	<u>2.00</u>	to bottom of antenna mount	
Stamping on Mark:	<u>N/A</u>	Weather Condition: <u>Mostly Cloudy ~ 74°</u>			





1012C-2-31MAR2012



1012C-3E-31MAR2012

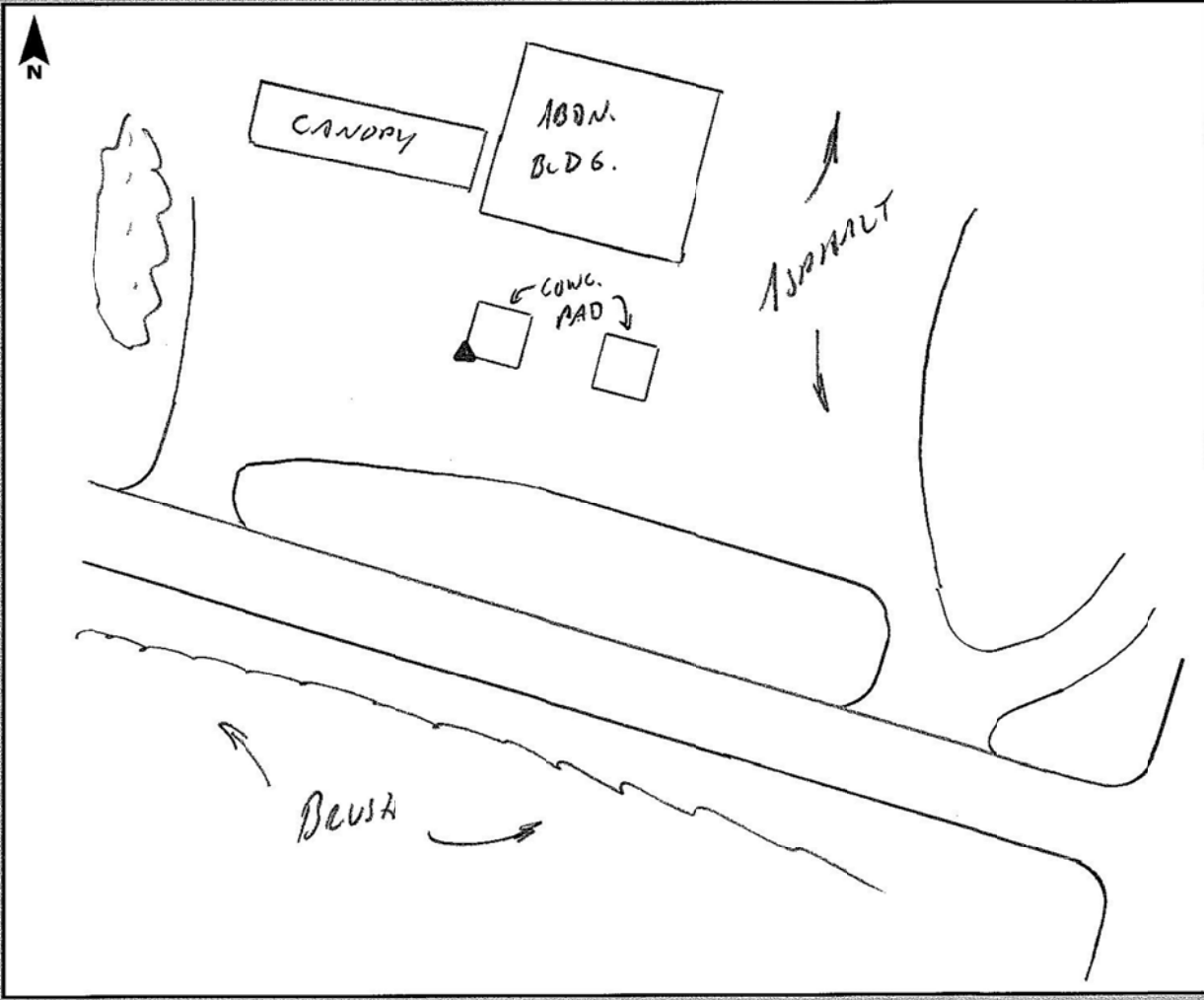


1012C-3S-31MAR2012

GPS Observation Log Sheet



Project Name: <u>LIDAR GC - ALA 3 COUNTY</u>	Project Number: <u>71899</u>	Survey Date: <u>4-3-12</u>
Station Name: <u>1013</u>	Operator Name: <u>J SPEELMAN</u>	
Latitude: <u>34° 41' 45.86"</u>	Julian Day: <u>094</u>	Session No. _____
Longitude: <u>85° 29' 00.23"</u>	Start Time: _____	End Time: _____
Ellip. Height: <u>776.099'</u>	Data File Name: <u>ALABAMA2012.DL (CMTK)</u>	
Type of Mark: <u>MAZ NAIL (PID)</u>	Type of Receiver: <u>TRIMBLE R2</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>INTERNAV</u>	
Weather Condition: <u>PC 80°</u>	Antenna Height: <u>2.0 m</u>	to bottom of antenna mount





1013-2-03APR2012



1013-3SE-03APR2012

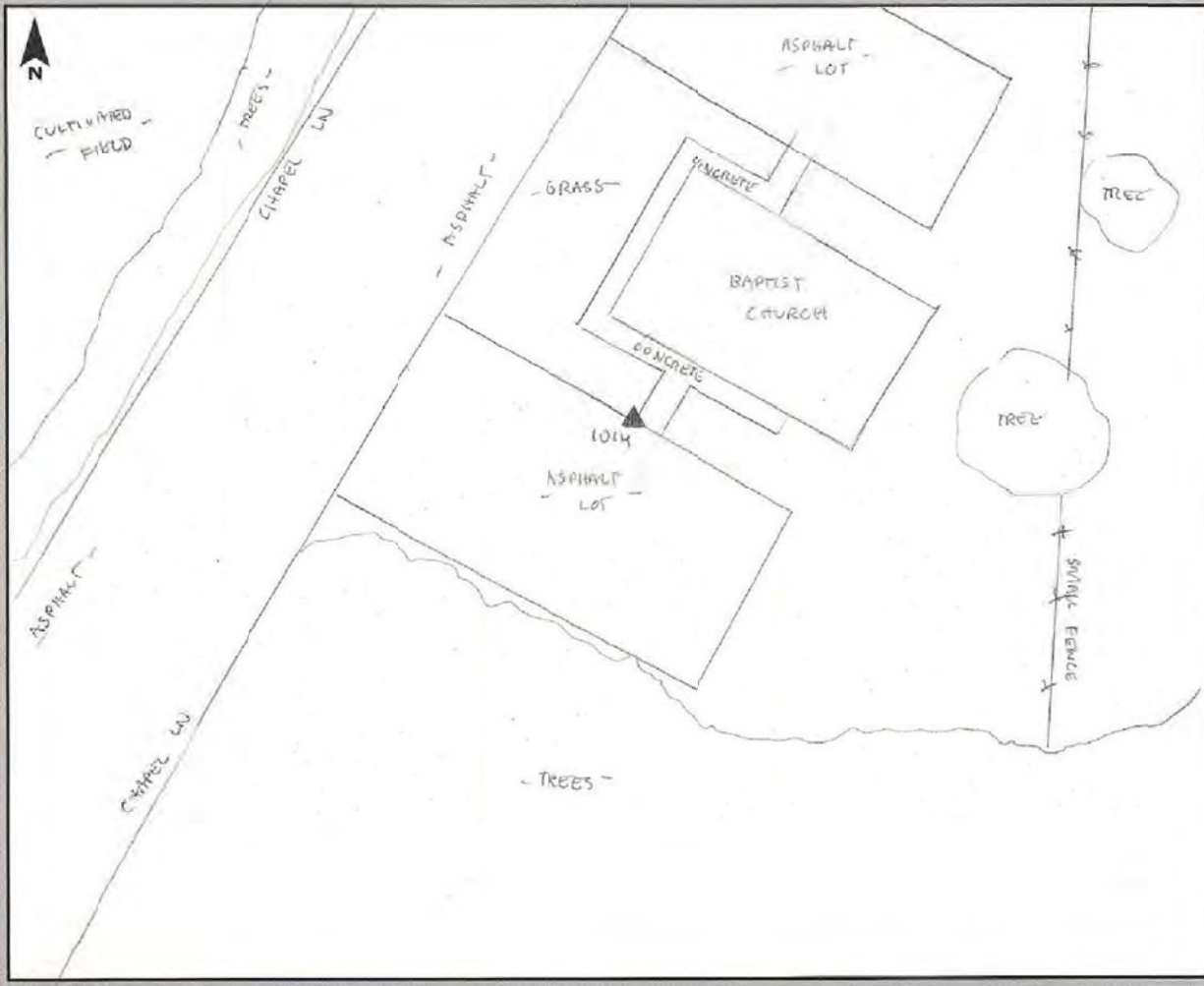


1013-3NE-03APR2012

GPS Observation Log Sheet



Project Name:	5 Co AL LIDAR	Project Number:	71899	Survey Date:	3/31/2012
Station Name:	1014	Operator Name:	Cody Schneider		
Latitude:	N34°36'01.29"	Julian Day:	91	Session No.:	N/A
Longitude:	W86°10'00.20"	Start Time:	16:17	End Time:	16:22
Ellip. Height:	374.6 m	Data File Name:	AL_LIDAR_91_CJS		
Type of Mark:	Marked point	Type of Receiver:	RE-3 #0364		
Stamping on Mark:	N/A	Type of Antenna:	RE-3 #0364		
Weather Condition:	Mostly Cloudy @ 75°	Antenna Height:	2.00 m	to bottom of antenna mount	





1014-2-31MAR2012



1014-3SE-31MAR2012

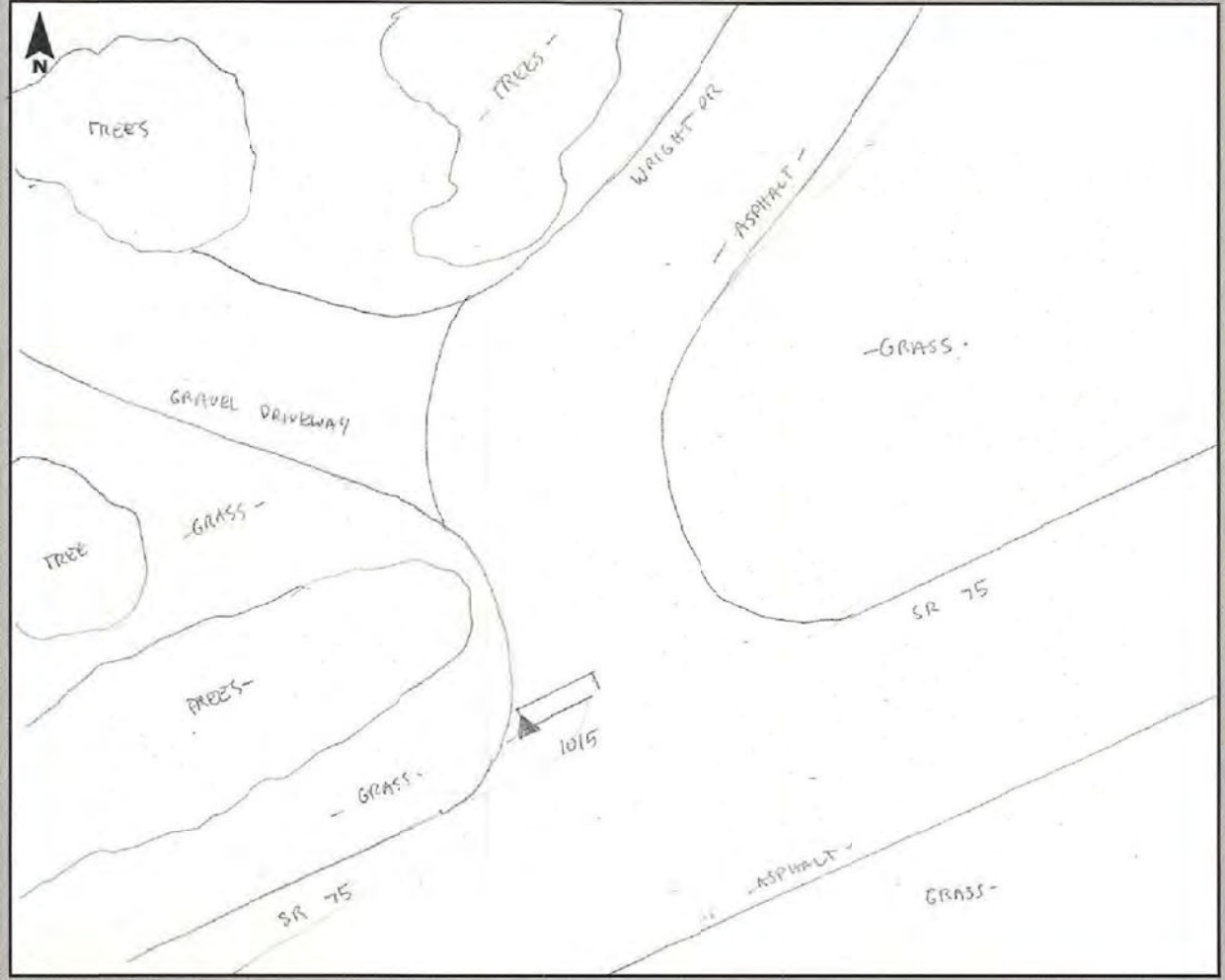


1014-3NE-31MAR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71899</u>	Survey Date: <u>3/28/2012</u>
Station Name: <u>1015</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N34°09'40.31"</u>	Julian Day: <u>88</u>	Session No. <u>N/A</u>
Longitude: <u>W86°20'49.90"</u>	Start Time: <u>15:19</u>	End Time: <u>15:23</u>
Ellip. Height: <u>250.2 m</u>	Data File Name: <u>AL-LIDAR-88-CJS</u>	
Type of Mark: <u>Mag Nail</u>	Type of Receiver: <u>R8-3 #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>R8-3 #0364</u>	
Weather Condition: <u>Partly Cloudy ≈ 73°</u>	Antenna Height: <u>2.00 m</u>	to bottom of antenna mount





1015-2-28MAR2012



1015-3SW-28MAR2012

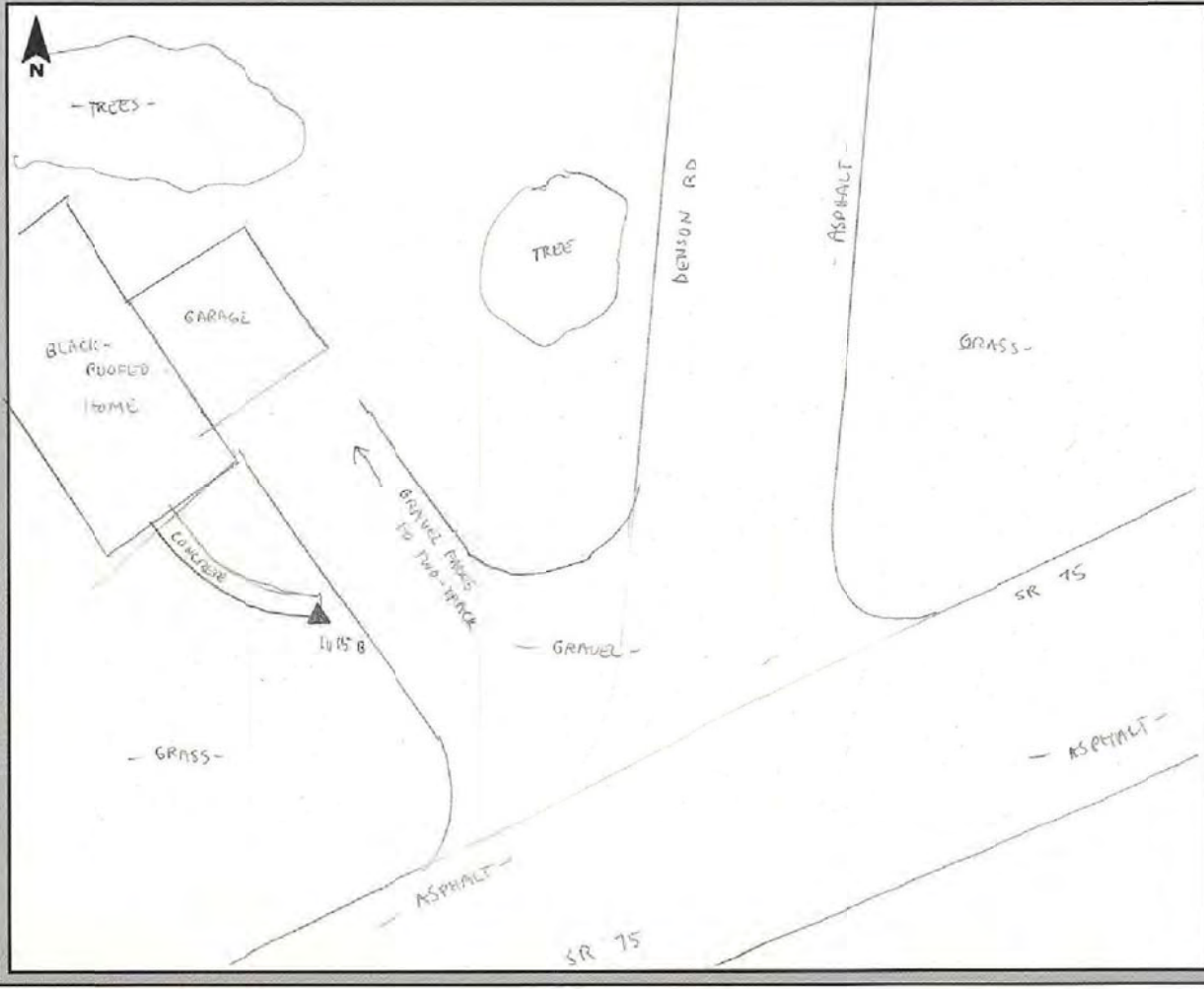


1015-3SE-28MAR2012

GPS Observation Log Sheet



Project Name: <u>5 Co AL LIDAR</u>	Project Number: <u>71894</u>	Survey Date: <u>3/29/2012</u>
Station Name: <u>1015-B</u>	Operator Name: <u>Cody Schneider</u>	
Latitude: <u>N 34° 09' 52.48</u>	Julian Day: <u>89</u>	Session No. <u>N/A</u>
Longitude: <u>W 86° 20' 26.10"</u>	Start Time: <u>17:23</u>	End Time: <u>17:28</u>
Ellip. Height: <u>251.5 m</u>	Data File Name: <u>AL-LIDAR_89_CS</u>	
Type of Mark: <u>Marked point</u>	Type of Receiver: <u>R8-3 #0364</u>	
Stamping on Mark: <u>N/A</u>	Type of Antenna: <u>R8-3 #0364</u>	
Weather Condition: <u>Partly Cloudy @ 70°</u>	Antenna Height: <u>2.00</u>	to bottom of antenna mount





1015B-2-29MAR2012



1015B-3SW-29MAR2012



1015B-3N-29MAR2012

SECTION 4: EXISTING NGS DATA SHEETS

This section contains the published National Geodetic Survey (NGS) Data Sheets used in the final control network for this project.

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EF1323 *****
EF1323 DESIGNATION - K 476
EF1323 PID - EF1323
EF1323 STATE/COUNTY- AL/JACKSON
EF1323 USGS QUAD - SCOTTSBORO (1982)
EF1323
EF1323 *CURRENT SURVEY CONTROL
EF1323
EF1323 *NAD 83(2007)- 34 41 11.24641(N) 086 06 00.75733(W) NO CHECK
EF1323 *NAVD 88 - 199.475 (meters) 654.44 (feet) ADJUSTED
EF1323
EF1323 EPOCH DATE - 2002.00
EF1323 X - 357,090.983 (meters) COMP
EF1323 Y - -5,238,282.947 (meters) COMP
EF1323 Z - 3,609,416.418 (meters) COMP
EF1323 LAPLACE CORR- -0.64 (seconds) DEFLECO9
EF1323 ELLIP HEIGHT- 170.622 (meters) (02/10/07) NO CHECK
EF1323 GEOID HEIGHT- -28.86 (meters) GEOID09
EF1323 DYNAMIC HT - 199.276 (meters) 653.79 (feet) COMP
EF1323
EF1323 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----
EF1323 Type PID Designation North East Ellip
EF1323 -----
EF1323 NETWORK EF1323 K 476 1.20 0.80 3.10
EF1323 -----
EF1323 MODELED GRAV- 979,635.3 (mgal) NAVD 88
EF1323
EF1323 VERT ORDER - FIRST CLASS II
EF1323
EF1323.The horizontal coordinates were established by GPS observations
EF1323.and adjusted by the National Geodetic Survey in February 2007.
EF1323
EF1323.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
EF1323.See National Readjustment for more information.
EF1323
EF1323.The horizontal coordinates are valid at the epoch date displayed above
EF1323.which is a decimal equivalence of Year/Month/Day.
EF1323
EF1323.No horizontal observational check was made to the station.
EF1323.
EF1323.The orthometric height was determined by differential leveling and
EF1323.adjusted in June 1991.
EF1323
EF1323.The X, Y, and Z were computed from the position and the ellipsoidal ht.
EF1323
EF1323.The Laplace correction was computed from DEFLECO9 derived deflections.
EF1323
EF1323.The ellipsoidal height was determined by GPS observations
EF1323.and is referenced to NAD 83.
EF1323
EF1323.The geoid height was determined by GEOID09.
EF1323

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EF1323.The dynamic height is computed by dividing the NAVD 88
 EF1323.geopotential number by the normal gravity value computed on the
 EF1323.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 EF1323.degrees latitude ($g = 980.6199$ gals.).
 EF1323
 EF1323.The modeled gravity was interpolated from observed gravity values.
 EF1323
 EF1323; North East Units Scale Factor Converg.
 EF1323;SPC AL E - 464,281.305 175,545.664 MT 0.99996737 -0 09 06.8
 EF1323;UTM 16 - 3,838,641.591 582,420.464 MT 0.99968373 +0 30 43.5
 EF1323
 EF1323! - Elev Factor x Scale Factor = Combined Factor
 EF1323!SPC AL E - 0.99997322 x 0.99996737 = 0.99994059
 EF1323!UTM 16 - 0.99997322 x 0.99968373 = 0.99965696
 EF1323
 EF1323 SUPERSEDED SURVEY CONTROL
 EF1323
 EF1323 ELLIP H (08/18/03) 170.640 (m) GP() 3 1
 EF1323 NAD 83(1992)- 34 41 11.24606(N) 086 06 00.75783(W) AD() 1
 EF1323 ELLIP H (01/10/02) 170.631 (m) GP() 3 1
 EF1323 NAVD 88 (01/10/02) 199.48 (m) 654.5 (f) LEVELING 3
 EF1323
 EF1323.Superseded values are not recommended for survey control.
 EF1323.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 EF1323.See file dsdata.txt to determine how the superseded data were derived.
 EF1323
 EF1323_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SED8242038641(NAD 83)
 EF1323
 EF1323_MARKER: DB = BENCH MARK DISK
 EF1323_SETTING: 66 = SET IN ROCK OUTCROP
 EF1323_SP_SET: ROCK OUTCROP
 EF1323_STAMPING: K 476 1983
 EF1323_MARK LOGO: NGS
 EF1323_MAGNETIC: O = OTHER; SEE DESCRIPTION
 EF1323_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
 EF1323+STABILITY: POSITION/ELEVATION WELL
 EF1323_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 EF1323+SATELLITE: SATELLITE OBSERVATIONS - April 13, 2001
 EF1323
 EF1323 HISTORY - Date Condition Report By
 EF1323 HISTORY - 1983 MONUMENTED NGS
 EF1323 HISTORY - 20010401 GOOD NGS
 EF1323 HISTORY - 20010413 GOOD NGS
 EF1323
 EF1323 STATION DESCRIPTION
 EF1323
 EF1323'DESCRIBED BY NATIONAL GEODETIC SURVEY 1983
 EF1323'6.3 KM (3.9 MI) WEST FROM SCOTTSBORO.
 EF1323'6.3 KM (3.9 MI) WESTERLY ALONG STATE HIGHWAY 35 FROM THE POST OFFICE
 EF1323'IN SCOTTSBORO, AT THE NORTHWEST ANGLE OF THE INTERSECTION WITH STATE
 EF1323'HIGHWAY 79, SET IN BEDROCK, 56.84 METERS (186.5 FT) NORTH OF THE
 EF1323'CENTERLINE OF STATE HIGHWAY 35, 15.12 METERS (49.6 FT) WEST OF THE

EF1323'CENTERLINE OF STATE HIGHWAY 79 SOUTHBOUND, 12.92 METERS (42.4 FT)
EF1323'SOUTH-SOUTHWEST OF THE SOUTHWEST EDGE OF THE WEST WINGWALL OF A SMALL
EF1323'CULVERT UNDER STATE HIGHWAY 79, AND 7.92 METERS (26.0 FT)
EF1323'EAST-SOUTHEAST OF A POWERLINE POLE.
EF1323'THE MARK IS 1.3 METERS W FROM A WITNESS POST.
EF1323'THE MARK IS ABOVE LEVEL WITH STATE HIGHWAY 79.

EF1323

EF1323 STATION RECOVERY (2001)

EF1323

EF1323'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2001 (AJL)
EF1323'THIS STATION IS 3.9 MILES WEST OF SCOTSBORO IN THE NORTHWEST QUADRANT
EF1323'OF THE JUNCTION OF STATE
EF1323'HIGHWAYS 79 AND 35. THE STATION IS SET IN A BEDROCK OUTCROP.
EF1323'TO REACH THE STATION FROM THE JUNCTION U.S. HIGHWAYS 72 AND STATE
EF1323'HIGHWAY 79. GO NORTH ON
EF1323'STATE HIGHWAY 79 FOR 4.75 MILES TO THE JUNCTION OF STATE HIGHWAYS 35
EF1323'AND STATION AS DESCRIBED.

EF1323'

EF1323'THE STATION IS 186.5 FEET NORTH OF THE CENTERLINE OF STATE HIGHWAY 35,
EF1323'49.6 FEET WEST OF THE
EF1323'CENTERLINE OF STATE HIGHWAY 79. 42.92 FEET SOUTH SOUTHEAST OF THE
EF1323'SOUTHWEST EDGE OF THE WEST
EF1323'WINGWALL OF A SMALL CULVERT UNDER STATE HIGHWAY 79 AND 24.4 FEET EAST
EF1323'SOUTEAST OF A POWER
EF1323'POLE. THE MARK IS ABOVE THE LEVEL OF THE HIGHWAY. THE STATION IS A
EF1323'STANDARD NGS VERTICAL BENCH
EF1323'MARK CEMENTED INTO BEDROCK.

EF1323'

EF1323

EF1323 STATION RECOVERY (2001)

EF1323

EF1323'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2001 (RTN)
EF1323'RECOVERED IN GOOD CONDITION.

BH0024 *****

BH0024 DESIGNATION - Q 120

BH0024 PID - BH0024

BH0024 STATE/COUNTY- AL/MOBILE

BH0024 COUNTRY - US

BH0024 USGS QUAD - KUSHLA (1982)

BH0024

BH0024 *CURRENT SURVEY CONTROL

BH0024

BH0024* NAD 83(1986) POSITION- 30 47 37. (N) 088 08 39. (W) SCALED

BH0024* NAVD 88 ORTHO HEIGHT - 5.710 (meters) 18.73 (feet) POSTED

BH0024

BH0024 GEOID HEIGHT - -28.61 (meters) GEOID09

BH0024 DYNAMIC HEIGHT - 5.70 (meters) 18.7 (feet) COMP

BH0024 MODELED GRAVITY - 979,336.1 (mgal) NAVD 88

BH0024

BH0024 VERT ORDER - * POSTED, Code A , SEE BELOW

BH0024

BH0024.The horizontal coordinates were scaled from a topographic map and have

BH0024.an estimated accuracy of +/- 6 seconds.

BH0024.

BH0024.The orthometric height was determined by differential leveling

BH0024.and adjusted by the in 1992.

BH0024

BH0024.* This is a POSTED BENCH MARK height. Code A indicates a distribution

BH0024.rate of 0.0 thru 1.0 mm/km.

BH0024

BH0024.The dynamic height is computed by dividing the NAVD 88

BH0024.geopotential number by the normal gravity value computed on the

BH0024.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

BH0024.degrees latitude (g = 980.6199 gals.).

BH0024

BH0024.The modeled gravity was interpolated from observed gravity values.

BH0024

BH0024;	North	East	Units	Estimated Accuracy
BH0024;SPC AL W	- 88,150.	538,350.	MT	(+/- 180 meters Scaled)

BH0024

BH0024 SUPERSEDED SURVEY CONTROL

BH0024

BH0024 NGVD 29 (??/??/??) 5.736 (m) 18.82 (f) ADJUSTED 1 2

BH0024

BH0024.Superseded values are not recommended for survey control.

BH0024.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

BH0024.See file dsdata.txt to determine how the superseded data were derived.

BH0024

BH0024_U.S. NATIONAL GRID SPATIAL ADDRESS: 16RCV905072(NAD 83)

BH0024

BH0024_MARKER: DB = BENCH MARK DISK

BH0024_SETTING: 30 = SET IN A LIGHT STRUCTURE

BH0024_SP_SET: TREE

BH0024_STAMPING: Q-120 1940

BH0024_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

BH0024

BH0024 HISTORY - Date Condition Report By

BH0024 HISTORY - 1940 MONUMENTED CGS

BH0024

BH0024 STATION DESCRIPTION

BH0024

BH0024'DESCRIBED BY COAST AND GEODETIC SURVEY 1940

BH0024'4 MI NW FROM WHISTLER.

BH0024'4 MILES NORTH-WEST ALONG THE GULF, MOBILE AND OHIO RAILROAD FROM THE

BH0024'STATION AT WHISTLER, 9 RAILS SOUTH OF MILE-POST NO. 9, 1.5 POLES

BH0024'SOUTH OF MILE-POST NO. 9, 54.4 FEET WEST OF CENTER-LINE OF TRACK, 115

BH0024'FEET NORTH-WEST OF TELEPHONE POLE NO. 4720, 96.5 FEET NORTH-WEST OF

BH0024'TELEGRAPH POLE SOUTH OF MILE-POST NO. 9, 6 FEET WEST OF R/W FENCE, A

BH0024'STANDARD DISK STAMPED Q-120 1940, SET VERTICALLY IN TREE, 4 FEET

BH0024'ABOVE GROUND.

EE1500 *****

EE1500 DESIGNATION - X 479

EE1500 PID - EE1500

EE1500 STATE/COUNTY- AL/JACKSON

EE1500 USGS QUAD - DORAN COVE (1988)

EE1500

EE1500 *CURRENT SURVEY CONTROL

EE1500* NAD 83(1986)- 34 54 50. (N) 085 46 25. (W) SCALED

EE1500* NAVD 88 - 190.062 (meters) 623.56 (feet) ADJUSTED

EE1500 GEOID HEIGHT- -28.94 (meters) GEOID09

EE1500 DYNAMIC HT - 189.875 (meters) 622.95 (feet) COMP

EE1500 MODELED GRAV- 979,651.5 (mgal) NAVD 88

EE1500

EE1500 VERT ORDER - FIRST CLASS II

EE1500

EE1500.The horizontal coordinates were scaled from a topographic map and have
 EE1500.an estimated accuracy of +/- 6 seconds.

EE1500.

EE1500.The orthometric height was determined by differential leveling and
 EE1500.adjusted in June 1991.

EE1500

EE1500.Photographs are available for this station.

EE1500

EE1500.The geoid height was determined by GEOID09.

EE1500

EE1500.The dynamic height is computed by dividing the NAVD 88
 EE1500.geopotential number by the normal gravity value computed on the
 EE1500.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 EE1500.degrees latitude (g = 980.6199 gals.).

EE1500

EE1500.The modeled gravity was interpolated from observed gravity values.

EE1500

EE1500;	North	East	Units	Estimated Accuracy
EE1500;SPC AL E	- 489,480.	205,460.	MT	(+/- 180 meters Scaled)

EE1500

EE1500 SUPERSEDED SURVEY CONTROL

EE1500

EE1500.No superseded survey control is available for this station.

EE1500

EE1500_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SFD120641(NAD 83)

EE1500

EE1500_MARKER: I = METAL ROD

EE1500_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

EE1500_SP_SET: STAINLESS STEEL ROD

EE1500_STAMPING: X 479 1983

EE1500_MARK LOGO: NGS

EE1500_PROJECTION: RECESSED 5 CENTIMETERS

EE1500_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

EE1500_ROD/PIPE-DEPTH: 16.5 meters

EE1500

EE1500 HISTORY - Date Condition Report By
EE1500 HISTORY - 1983 MONUMENTED NGS
EE1500 HISTORY - 20090310 GOOD JCLS
EE1500 HISTORY - 20100415 GOOD JCLS
EE1500 HISTORY - 20110418 GOOD JCLS

EE1500

EE1500 STATION DESCRIPTION

EE1500

EE1500'DESCRIBED BY NATIONAL GEODETIC SURVEY 1983

EE1500'7.6 KM (4.75 MI) NE FROM STEVENSON.

EE1500'3.2 KM (2.0 MI) NORTHEASTERLY ALONG SECOND STREET FROM THE POST OFFICE

EE1500'IN STEVENSON, THENCE 4.4 KM (2.75 MI) NORTHEAST ALONG U.S. HIGHWAY 72,

EE1500'AT THE NORTH JACKSON HOSPITAL, ALSO, 0.1 KM (0.05 MI) SOUTHWEST ALONG

EE1500'A PAVED ROAD (DIAMOND AVENUE) FROM THE CHURCH OF CHRIST CHURCH IN

EE1500'BRIDGEPORT, THENCE 6.6 KM (4.1 MI) SOUTHWEST ALONG U.S. HIGHWAY 72,

EE1500'24.23 METERS (79.5 FT) SOUTH-SOUTHEAST OF THE CENTERLINE OF THE

EE1500'HIGHWAY, 63.73 METERS (209.1 FT) WEST-NORTHWEST OF THE NORTHWEST

EE1500'CORNER OF THE WESTERNMOST END OF THE HOSPITAL (SLOPE DISTANCE),

EE1500'20.76 METERS (68.1 FT) SOUTH-SOUTHWEST OF THE SOUTHWEST EDGE OF THE

EE1500'SOUTH END OF A WINGWALL OF A SMALL DOUBLE CULVERT, 7.47 METERS

EE1500'(24.5 FT) NORTHEAST OF THE CENTER OF A GRAVEL ROAD LEADING SOUTHEAST,

EE1500'AND 0.88 METERS (2.9 FT) NORTHWEST OF TELEPHONE CABLE POLE NUMBER

EE1500'3361. NOTE, THE ROD WAS DRIVEN TO REFUSAL.

EE1500'THE MARK IS 13.7 METERS SE FROM A WITNESS POST.

EE1500'THE MARK IS ABOVE LEVEL WITH HIGHWAY.

EE1500

EE1500 STATION RECOVERY (2009)

EE1500

EE1500'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2009

EE1500'RECOVERED IN GOOD CONDITION.

EE1500

EE1500 STATION RECOVERY (2010)

EE1500

EE1500'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2010

EE1500'RECOVERED IN GOOD CONDITION.

EE1500

EE1500 STATION RECOVERY (2011)

EE1500

EE1500'RECOVERY NOTE BY JOHN CHANCE LAND SURVEYS INC 2011

EE1500'RECOVERED IN GOOD CONDITION.

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EE2309 *****
EE2309 DESIGNATION - 25 10
EE2309 PID - EE2309
EE2309 STATE/COUNTY- AL/DE KALB
EE2309 USGS QUAD - CHAVIES (1983)
EE2309
EE2309 *CURRENT SURVEY CONTROL
EE2309
EE2309 _____
EE2309* NAD 83(2007)- 34 22 33.65398(N) 085 46 44.25782(W) ADJUSTED
EE2309* NAVD 88 - 273.54 (meters) 897.4 (feet) N HEIGHT
EE2309 _____
EE2309 EPOCH DATE - 2002.00
EE2309 X - 387,896.974 (meters) COMP
EE2309 Y - -5,255,728.379 (meters) COMP
EE2309 Z - 3,581,086.925 (meters) COMP
EE2309 LAPLACE CORR- 1.17 (seconds) DEFLECO9
EE2309 ELLIP HEIGHT- 244.740 (meters) (02/10/07) ADJUSTED
EE2309 GEOID HEIGHT- -28.76 (meters) GEOID09
EE2309 DYNAMIC HT - 273.25 (meters) 896.5 (feet) COMP
EE2309
EE2309 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----
EE2309 Type PID Designation North East Ellip
EE2309 -----
EE2309 NETWORK EE2309 25 10 1.10 0.96 2.92
EE2309 -----
EE2309 MODELED GRAV- 979,590.8 (mgal) NAVD 88
EE2309
EE2309 VERT ORDER - THIRD
EE2309
EE2309.The horizontal coordinates were established by GPS observations
EE2309.and adjusted by the National Geodetic Survey in February 2007.
EE2309
EE2309.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
EE2309.See National Readjustment for more information.
EE2309
EE2309.The horizontal coordinates are valid at the epoch date displayed above
EE2309.which is a decimal equivalence of Year/Month/Day.
EE2309
EE2309.The orthometric height was determined by differential leveling
EE2309.and adjusted in September 1998.
EE2309
EE2309.The height was determined by precise leveling from only one NSRS
EE2309.bench mark. This was not adequate "tie leveling" to NSRS and was
EE2309.allowed ONLY to validate the GPS-derived height.
EE2309
EE2309.The X, Y, and Z were computed from the position and the ellipsoidal ht.
EE2309
EE2309.The Laplace correction was computed from DEFLECO9 derived deflections.
EE2309
EE2309.The ellipsoidal height was determined by GPS observations
EE2309.and is referenced to NAD 83.
EE2309

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EE2309.The geoid height was determined by GEOID09.
 EE2309
 EE2309.The dynamic height is computed by dividing the NAVD 88
 EE2309.geopotential number by the normal gravity value computed on the
 EE2309.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 EE2309.degrees latitude ($g = 980.6199$ gals.).
 EE2309
 EE2309.The modeled gravity was interpolated from observed gravity values.
 EE2309
 EE2309; North East Units Scale Factor Converg.
 EE2309;SPC AL E - 429,813.615 205,000.781 MT 0.99996031 +0 01 50.5
 EE2309;UTM 16 - 3,804,524.537 612,264.184 MT 0.99975535 +0 41 22.2
 EE2309
 EE2309! - Elev Factor x Scale Factor = Combined Factor
 EE2309!SPC AL E - 0.99996158 x 0.99996031 = 0.99992189
 EE2309!UTM 16 - 0.99996158 x 0.99975535 = 0.99971694
 EE2309
 EE2309: Primary Azimuth Mark Grid Az
 EE2309:SPC AL E - 25 9 203 45 43.5
 EE2309:UTM 16 - 25 9 203 06 11.8
 EE2309
 EE2309|-----|
 EE2309| PID Reference Object Distance Geod. Az |
 EE2309| dddmmss.s |
 EE2309| EE2323 25 9 443.284 METERS 2034734.0 |
 EE2309|-----|
 EE2309
 EE2309 SUPERSEDED SURVEY CONTROL
 EE2309
 EE2309 ELLIP H (07/29/02) 244.712 (m) GP() 4 1
 EE2309 NAD 83(1992)- 34 22 33.65370(N) 085 46 44.25954(W) AD() 1
 EE2309 ELLIP H (12/04/92) 244.792 (m) GP() 4 1
 EE2309 NAD 83(1992)- 34 22 33.66014(N) 085 46 44.25907(W) AD() 1
 EE2309 NGVD 29 (??/??/??) 273.53 (m) 897.4 (f) N HEIGHT 3
 EE2309
 EE2309.Superseded values are not recommended for survey control.
 EE2309.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 EE2309.See file dsdata.txt to determine how the superseded data were derived.
 EE2309
 EE2309_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SFD1226404524(NAD 83)
 EE2309
 EE2309_MARKER: DD = SURVEY DISK
 EE2309_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 EE2309_SP_SET: CONCRETE POST
 EE2309_STAMPING: 25 - 10 1990
 EE2309_MARK LOGO: ALHD
 EE2309_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT
 EE2309_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 EE2309+STABILITY: SURFACE MOTION
 EE2309_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 EE2309+SATELLITE: SATELLITE OBSERVATIONS - November 06, 2009
 EE2309

EE2309 HISTORY - Date Condition Report By
EE2309 HISTORY - 1990 MONUMENTED ALHD
EE2309 HISTORY - 20040401 GOOD ALHD
EE2309 HISTORY - 20091106 GOOD TVA

EE2309

EE2309 STATION DESCRIPTION

EE2309

EE2309'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1990

EE2309'THE STATION IS LOCATED IN DEKALB COUNTY ON THE EAST RIGHT OF WAY OF U.

EE2309'S. 11, ABOUT 9.25 KM (5.75 MI) SOUTHWEST OF FORT PAYNE AND ABOUT

EE2309'14.40 KM (8.95 MI) NORTHEAST OF COLLINSVILLE.

EE2309'TO REACH THE STATION FROM THE SOUTH JUNCTION OF U. S. 11, GAULT AVENUE

EE2309'SOUTH, AND ALA 35 NORTH, DRIVE SOUTH ON U. S. 11 7.48 KM (4.65 MI) TO

EE2309'MILE POST 224.10, DEKALB COUNTY ROAD NO. 81 ON THE LEFT, AND THE

EE2309'STATION ON THE RIGHT.

EE2309'THE STATION IS 11.19 M (36.71 FT) WEST - NORTHWEST OF THE CENTERLINE

EE2309'OF U. S. 11, 16.34 M (53.61 FT) SOUTH - SOUTHWEST OF A JUNCTION POWER

EE2309'POLE WITH A TRANSFORMER, 23.47 M (77.00 FT) SOUTH - SOUTHWEST OF THE

EE2309'EAST END OF AN AKINS FURNITURE SIGN, 23.47 M (77.00 FT) WEST -

EE2309'SOUTHWEST OF THE CENTER OF THE INTERSECTION OF U. S. 11 AND DEKALB

EE2309'COUNTY ROAD NO. 81, 24.14 M (79.20 FT) SOUTH - SOUTHWEST OF THE WEST

EE2309'END OF AN AKINS FURNITURE SIGN, 0.88 M (2.89 FT) EAST - SOUTHEAST OF

EE2309'A CARSONITE WITNESS POST, AND SET FLUSH WITH THE GROUND.

EE2309'STATION 25 - 9 1990 MAY BE USED AS AN AZIMUTH FOR THIS STATION.

EE2309

EE2309 STATION RECOVERY (2004)

EE2309

EE2309'RECOVERY NOTE BY ALABAMA HIGHWAY DEPARTMENT 2004 (JDS)

EE2309'RECOVERED IN GOOD CONDITION.

EE2309

EE2309 STATION RECOVERY (2009)

EE2309

EE2309'RECOVERY NOTE BY TENNESSEE VALLEY AUTHORITY 2009 (MWN)

EE2309'RECOVERED, ADDENDUM TO DESCRIPTION, STATION IS LOCATED 2.33 FEET FROM

EE2309'A METAL FENCE POST. STATION IS LOCATED 7.7 FEET WEST FROM A OVERHEAD

EE2309'2.9KV SERVICE LINE, STATION IS ALSO LOCATED N-18-45-45W (MAGNETIC) 17

EE2309'FEET FROM A WATER VALVE.

AA2951 *****

AA2951 DESIGNATION - 25 23

AA2951 PID - AA2951

AA2951 STATE/COUNTY- AL/DE KALB

AA2951 USGS QUAD - CROSSVILLE (1975)

AA2951

AA2951 *CURRENT SURVEY CONTROL

AA2951

AA2951* NAD 83(2007)- 34 19 53.78840(N) 085 59 55.84299(W) ADJUSTED

AA2951* NAVD 88 - 339.5 (meters) 1114. (feet) VERTCON

AA2951

AA2951 EPOCH DATE - 2002.00

AA2951 X - 367,921.954 (meters) COMP

AA2951 Y - -5,260,005.653 (meters) COMP

AA2951 Z - 3,577,057.135 (meters) COMP

AA2951 LAPLACE CORR- 0.96 (seconds) DEFLEC09

AA2951 ELLIP HEIGHT- 310.593 (meters) (02/10/07) ADJUSTED

AA2951 GEOID HEIGHT- -28.87 (meters) GEOID09

AA2951

AA2951 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AA2951 Type PID Designation North East Ellip

AA2951 -----

AA2951 NETWORK AA2951 25 23 1.18 0.84 2.76

AA2951 -----

AA2951

AA2951.The horizontal coordinates were established by GPS observations

AA2951.and adjusted by the National Geodetic Survey in February 2007.

AA2951

AA2951.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AA2951.See National Readjustment for more information.

AA2951

AA2951.The horizontal coordinates are valid at the epoch date displayed above

AA2951.which is a decimal equivalence of Year/Month/Day.

AA2951

AA2951.The NAVD 88 height was computed by applying the VERTCON shift value to

AA2951.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)

AA2951

AA2951.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA2951

AA2951.The Laplace correction was computed from DEFLEC09 derived deflections.

AA2951

AA2951.The ellipsoidal height was determined by GPS observations

AA2951.and is referenced to NAD 83.

AA2951

AA2951.The geoid height was determined by GEOID09.

AA2951

AA2951; North East Units Scale Factor Converg.

AA2951;SPC AL E - 424,898.853 184,769.490 MT 0.99996286 -0 05 36.0

AA2951;UTM 16 - 3,799,378.811 592,095.378 MT 0.99970455 +0 33 52.8

AA2951

AA2951! - Elev Factor x Scale Factor = Combined Factor

AA2951!SPC AL E - 0.99995125 x 0.99996286 = 0.99991411

AA2951|UTM 16 - 0.99995125 x 0.99970455 = 0.99965581

AA2951

AA2951: Primary Azimuth Mark Grid Az

AA2951:SPC AL E - 25 22 176 28 11.4

AA2951:UTM 16 - 25 22 175 48 42.6

AA2951

AA2951|-----|

AA2951| PID Reference Object Distance Geod. Az |

AA2951| dddmmss.s |

AA2951| AA2950 25 22 442.517 METERS 1762235.4 |

AA2951|-----|

AA2951

AA2951 SUPERSEDED SURVEY CONTROL

AA2951

AA2951 ELLIP H (07/29/02) 310.573 (m) GP() 4 1

AA2951 NAD 83(1992)- 34 19 53.78838(N) 085 59 55.84347(W) AD() 1

AA2951 ELLIP H (03/30/95) 310.656 (m) GP() 4 2

AA2951 NGVD 29 (03/30/95) 339.5 (m) 1114. (f) GPS OBS

AA2951

AA2951.Superseded values are not recommended for survey control.

AA2951.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AA2951.See file dsdata.txt to determine how the superseded data were derived.

AA2951

AA2951_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SEC9209599378(NAD 83)

AA2951

AA2951_MARKER: DD = SURVEY DISK

AA2951_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AA2951_SP_SET: CONCRETE POST

AA2951_STAMPING: 25-23 1993

AA2951_MARK LOGO: ALHD

AA2951_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT

AA2951_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AA2951+STABILITY: SURFACE MOTION

AA2951_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AA2951+SATELLITE: SATELLITE OBSERVATIONS - March 17, 2008

AA2951

AA2951 HISTORY - Date Condition Report By

AA2951 HISTORY - 1993 MONUMENTED ALHD

AA2951 HISTORY - 20080317 GOOD ALADT

AA2951

AA2951 STATION DESCRIPTION

AA2951

AA2951'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JDS)

AA2951'THE STATION IS LOCATED IN DEKALB COUNTY ON THE EAST RIGHT OF WAY OF

AA2951'ALA 227, ABOUT 2.10 MI (3.38 KM) SOUTH OF GERALDINE AND ABOUT 3.05 MI

AA2951'(4.91 KM) NORTH OF CROSSVILLE. TO REACH THE STATION FROM THE JUNCTION

AA2951'OF ALA 75 AND ALA 227 (MILE POST 28.90 ON ALA 227 AND MILE POST 72.00

AA2951'ON ALA 75) IN GERALDINE, DRIVE SOUTH ON ALA 227 FOR 2.20 MI (3.54 KM)

AA2951'TO MILE POST 26.70 AND THE STATION ON THE LEFT. THE STATION IS 2.9 FT

AA2951'(0.9 M) WEST OF A SIX STRAND BARBED WIRE FENCE ON OLD TREATED WOOD

AA2951'POSTS, 41.4 FT (12.6 M) EAST OF THE CENTERLINE OF ALA 227, 76.8 FT

AA2951'(23.4 M) SOUTH OF TRANSFORMER POWER POLE NO. 10, 84.8 FT (25.8 M)

AA2951' NORTH-NORTHWEST OF A POWER POLE, 3.2 FT (1.0 M) WEST OF A CARSONITE
AA2951' WITNESS POST, AND SET FLUSH WITH THE GROUND. STATION 25-22 1993 MAY BE
AA2951' USED AS AN AZIMUTH FOR THIS STATION.

AA2951

AA2951 STATION RECOVERY (2008)

AA2951

AA2951' RECOVERY NOTE BY ALABAMA DEPT OF TRANSPORTATION 2008 (JDS)

AA2951' RECOVERED IN GOOD CONDITION.

AA2974 *****

AA2974 DESIGNATION - 25 46

AA2974 PID - AA2974

AA2974 STATE/COUNTY- AL/DE KALB

AA2974 USGS QUAD - VALLEY HEAD (1983)

AA2974

AA2974 *CURRENT SURVEY CONTROL

AA2974

AA2974* NAD 83(2007)- 34 36 59.40011(N) 085 36 42.53090(W) ADJUSTED

AA2974* NAVD 88 - 289.9 (meters) 951. (feet) VERTCON

AA2974

AA2974 EPOCH DATE - 2002.00

AA2974 X - 402,072.561 (meters) COMP

AA2974 Y - -5,239,522.789 (meters) COMP

AA2974 Z - 3,603,083.525 (meters) COMP

AA2974 LAPLACE CORR- 0.04 (seconds) DEFLEC09

AA2974 ELLIP HEIGHT- 261.095 (meters) (02/10/07) ADJUSTED

AA2974 GEOID HEIGHT- -28.78 (meters) GEOID09

AA2974

AA2974 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AA2974 Type PID Designation North East Ellip

AA2974 -----

AA2974 NETWORK AA2974 25 46 1.31 1.14 3.06

AA2974 -----

AA2974

AA2974.The horizontal coordinates were established by GPS observations

AA2974.and adjusted by the National Geodetic Survey in February 2007.

AA2974

AA2974.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AA2974.See National Readjustment for more information.

AA2974

AA2974.The horizontal coordinates are valid at the epoch date displayed above

AA2974.which is a decimal equivalence of Year/Month/Day.

AA2974

AA2974.The NAVD 88 height was computed by applying the VERTCON shift value to

AA2974.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)

AA2974

AA2974.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA2974

AA2974.The Laplace correction was computed from DEFLEC09 derived deflections.

AA2974

AA2974.The ellipsoidal height was determined by GPS observations

AA2974.and is referenced to NAD 83.

AA2974

AA2974.The geoid height was determined by GEOID09.

AA2974

AA2974; North East Units Scale Factor Converg.

AA2974;SPC AL E - 456,510.855 220,315.181 MT 0.99996508 +0 07 33.0

AA2974;UTM 16 - 3,831,391.653 627,266.876 MT 0.99979964 +0 47 19.3

AA2974

AA2974! - Elev Factor x Scale Factor = Combined Factor

AA2974!SPC AL E - 0.99995902 x 0.99996508 = 0.99992410

AA2974!UTM 16 - 0.99995902 x 0.99979964 = 0.99975866

AA2974

AA2974: Primary Azimuth Mark Grid Az

AA2974:SPC AL E - 25 47 025 55 41.4

AA2974:UTM 16 - 25 47 025 15 55.1

AA2974

AA2974 |-----|

AA2974 | PID Reference Object Distance Geod. Az |

AA2974 | dddmmss.s |

AA2974 | AA2975 25 47 APPROX. 0.6 KM 0260314.4 |

AA2974 |-----|

AA2974

AA2974 SUPERSEDED SURVEY CONTROL

AA2974

AA2974 ELLIP H (07/29/02) 261.059 (m) GP() 4 1

AA2974 NAD 83(1992)- 34 36 59.39974(N) 085 36 42.53069(W) AD() 1

AA2974 ELLIP H (03/30/95) 261.154 (m) GP() 4 2

AA2974 NGVD 29 (03/30/95) 289.9 (m) 951. (f) GPS OBS

AA2974

AA2974.Superseded values are not recommended for survey control.

AA2974.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AA2974.See file dsdata.txt to determine how the superseded data were derived.

AA2974

AA2974_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SFD2726631391(NAD 83)

AA2974

AA2974_MARKER: DD = SURVEY DISK

AA2974_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AA2974_SP_SET: CONCRETE POST

AA2974_STAMPING: 25-46 1993

AA2974_MARK LOGO: ALHD

AA2974_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT

AA2974_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AA2974+STABILITY: SURFACE MOTION

AA2974_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AA2974+SATELLITE: SATELLITE OBSERVATIONS - July 10, 2001

AA2974

AA2974 HISTORY - Date Condition Report By

AA2974 HISTORY - 1993 MONUMENTED ALHD

AA2974 HISTORY - 20010710 GOOD ALHD

AA2974

AA2974 STATION DESCRIPTION

AA2974

AA2974'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JDS)

AA2974'THE STATION IS LOCATED IN DEKALB COUNTY ON THE WEST RIGHT OF WAY OF

AA2974'U.S. 11, ABOUT 3.00 MI (4.83 KM) NORTH-NORTHWEST OF MENTONE AND ABOUT

AA2974'8.10 MI (13.04 KM) EAST OF HENAGAR. TO REACH THE STATION FROM EXIT 231

AA2974'ON I-59 (MILE POST 11.80 ON ALA 117) NEAR HAMMONDVILLE, DRIVE

AA2974'SOUTHEAST ON ALA 117 FOR 1.25 MI (2.01 KM) TO MILE POST 10.55 AND U.S.

AA2974'11 LEFT AND RIGHT (MILE POST 242.00 ON U.S. 11), TURN LEFT ON U.S. 11

AA2974'AND DRIVE NORTHEAST FOR 2.55 MI (4.10 KM) TO MILE POST 244.55 AND THE

AA2974'STATION ON THE LEFT. THE STATION IS 38.0 FT (11.6 M) WEST-NORTHWEST OF

AA2974'THE CENTERLINE OF U.S. 11, 89.6 FT (27.3 M) WEST OF TELEPHONE CABLE

AA2974'PEDESTAL NO. 1 RE ACROSS THE ROAD, 142.4 FT (43.4 M) SOUTHWEST OF
AA2974'TELEPHONE CABLE PEDESTAL NO. 1 64 LP 4 ACROSS THE ROAD, 154.5 FT (47.1
AA2974'M) SOUTH-SOUTHWEST OF A TRANSFORMER POWER POLE, 1.7 FT (0.5 M)
AA2974'SOUTHEAST OF A CARSONITE WITNESS POST, AND SET FLUSH WITH THE GROUND.
AA2974'STATION 25-47 1993 MAY BE USED AS AN AZIMUTH FOR THIS STATION.

AA2974

AA2974 STATION RECOVERY (2001)

AA2974

AA2974'RECOVERY NOTE BY ALABAMA HIGHWAY DEPARTMENT 2001 (JDS)

AA2974'RECOVERED IN GOOD CONDITION.

AA2997 *****

AA2997 DESIGNATION - 36 21

AA2997 PID - AA2997

AA2997 STATE/COUNTY- AL/JACKSON

AA2997 USGS QUAD - TRENTON (1982)

AA2997

AA2997 *CURRENT SURVEY CONTROL

AA2997

AA2997* NAD 83(2007)- 34 52 27.57648(N) 085 36 24.91845(W) ADJUSTED

AA2997* NAVD 88 - 454.5 (meters) 1491. (feet) VERTCON

AA2997

AA2997 EPOCH DATE - 2002.00

AA2997 X - 401,281.575 (meters) COMP

AA2997 Y - -5,223,368.875 (meters) COMP

AA2997 Z - 3,626,680.747 (meters) COMP

AA2997 LAPLACE CORR- -1.44 (seconds) DEFLEC09

AA2997 ELLIP HEIGHT- 425.529 (meters) (02/10/07) ADJUSTED

AA2997 GEOID HEIGHT- -28.91 (meters) GEOID09

AA2997

AA2997 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AA2997 Type PID Designation North East Ellip

AA2997 -----

AA2997 NETWORK AA2997 36 21 1.43 1.33 4.10

AA2997 -----

AA2997

AA2997.The horizontal coordinates were established by GPS observations

AA2997.and adjusted by the National Geodetic Survey in February 2007.

AA2997

AA2997.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AA2997.See National Readjustment for more information.

AA2997

AA2997.The horizontal coordinates are valid at the epoch date displayed above

AA2997.which is a decimal equivalence of Year/Month/Day.

AA2997

AA2997.The NAVD 88 height was computed by applying the VERTCON shift value to

AA2997.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)

AA2997

AA2997.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA2997

AA2997.The Laplace correction was computed from DEFLEC09 derived deflections.

AA2997

AA2997.The ellipsoidal height was determined by GPS observations

AA2997.and is referenced to NAD 83.

AA2997

AA2997.The geoid height was determined by GEOID09.

AA2997

AA2997; North East Units Scale Factor Converg.

AA2997;SPC AL E - 485,113.037 220,699.437 MT 0.99996528 +0 07 46.0

AA2997;UTM 16 - 3,859,991.634 627,319.123 MT 0.99979979 +0 47 47.9

AA2997

AA2997! - Elev Factor x Scale Factor = Combined Factor

AA2997!SPC AL E - 0.99993321 x 0.99996528 = 0.99989849

AA2997!UTM 16 - 0.99993321 x 0.99979979 = 0.99973301

AA2997

AA2997: Primary Azimuth Mark Grid Az

AA2997:SPC AL E - 36 22 005 33 32.4

AA2997:UTM 16 - 36 22 004 53 30.5

AA2997

AA2997|-----|

AA2997| PID Reference Object Distance Geod. Az |

AA2997| dddmmss.s |

AA2997| AA2998 36 22 413.895 METERS 0054118.4 |

AA2997|-----|

AA2997

AA2997 SUPERSEDED SURVEY CONTROL

AA2997

AA2997 ELLIP H (07/29/02) 425.500 (m) GP() 4 1

AA2997 NAD 83(1992)- 34 52 27.57644(N) 085 36 24.91787(W) AD() 1

AA2997 ELLIP H (03/30/95) 425.611 (m) GP() 4 2

AA2997 NGVD 29 (03/30/95) 454.5 (m) 1491. (f) GPS OBS

AA2997

AA2997.Superseded values are not recommended for survey control.

AA2997.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AA2997.See file dsdata.txt to determine how the superseded data were derived.

AA2997

AA2997_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SFD2731959991(NAD 83)

AA2997

AA2997_MARKER: DD = SURVEY DISK

AA2997_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AA2997_SP_SET: CONCRETE POST

AA2997_STAMPING: 36-21 1993

AA2997_MARK LOGO: ALHD

AA2997_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT

AA2997_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AA2997+STABILITY: SURFACE MOTION

AA2997_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AA2997+SATELLITE: SATELLITE OBSERVATIONS - June 21, 2006

AA2997

AA2997 HISTORY - Date Condition Report By

AA2997 HISTORY - 1993 MONUMENTED ALHD

AA2997 HISTORY - 20060621 GOOD GADT

AA2997

AA2997 STATION DESCRIPTION

AA2997

AA2997'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JDS)

AA2997'THE STATION IS LOCATED IN JACKSON COUNTY ON THE WEST RIGHT OF WAY OF

AA2997'ALA 73, ABOUT 8.25 MI (13.28 KM) SOUTHEAST OF BRIDGEPORT AND ABOUT

AA2997'13.10 MI (21.08 KM) EAST OF STEVENSON. TO REACH THE STATION FROM THE

AA2997'JUNCTION OF ALA 71 AND ALA 117 (MILE POST 21.35 ON ALA 71 AND MILE

AA2997'POST 25.25 ON ALA 117) AT A FOUR WAY STOP IN FLAT ROCK, DRIVE

AA2997'NORTHEAST ON ALA 71 FOR 8.70 MI (14.00 KM) TO MILE POST 30.05 AND A

AA2997'Y-INTERSECTION WITH ALA 73 ON THE LEFT AND ALA 71 ON THE RIGHT, BEAR

AA2997'LEFT ON ALA 73 AND DRIVE NORTH FOR 1.25 MI (2.01 KM) TO MILE POST 1.25

AA2997'AND THE STATION ON THE LEFT. THE STATION IS 3.0 FT (0.9 M) EAST OF A

AA2997'HOG WIRE FENCE WITH ONE STRAND OF BARBED WIRE ON OLD TREATED WOOD
AA2997'POSTS, 4.9 FT (1.5 M) NORTHEAST OF THE SOUTHEAST CORNER OF THE FENCE,
AA2997'7.0 FT (2.1 M) NORTHWEST OF THE CENTER OF A CONCRETE WATER METER BOX,
AA2997'18.0 FT (5.5 M) NORTH OF THE CENTER OF A GRAVEL DRIVEWAY, 32.3 FT (9.8
AA2997'M) NORTH OF THE CROSS TIE EAST END POST OF A HOG WIRE FENCE ACROSS THE
AA2997'GRAVEL DRIVEWAY, 36.7 FT (11.2 M) WEST OF THE CENTERLINE OF ALA 73,
AA2997'92.4 FT (28.2 M) SOUTH OF TELEPHONE CABLE PEDESTAL NO. 1 39, 92.5 FT
AA2997'(28.2 M) SOUTH OF A TELEPHONE SERVICE POLE, 3.1 FT (0.9 M) EAST OF A
AA2997'CARSONITE WITNESS POST, AND SET FLUSH WITH THE GROUND. STATION 36-22
AA2997'1993 MAY BE USED AS AN AZIMUTH FOR THIS STATION.

AA2997

AA2997 STATION RECOVERY (2006)

AA2997

AA2997'RECOVERY NOTE BY GEORGIA DEPARTMENT OF TRANSPORTATION 2006

AA2997'RECOVERED IN GOOD CONDITION.

AA3005 *****

AA3005 DESIGNATION - 36 29

AA3005 PID - AA3005

AA3005 STATE/COUNTY- AL/JACKSON

AA3005 USGS QUAD - SYLVANIA (1983)

AA3005

AA3005 *CURRENT SURVEY CONTROL

AA3005

AA3005* NAD 83(2007)- 34 36 09.05133(N) 085 51 21.13234(W) ADJUSTED

AA3005* NAVD 88 - 439.1 (meters) 1441. (feet) VERTCON

AA3005 EPOCH DATE - 2002.00

AA3005 X - 379,823.380 (meters) COMP

AA3005 Y - -5,242,189.442 (meters) COMP

AA3005 Z - 3,601,891.325 (meters) COMP

AA3005 LAPLACE CORR- 0.41 (seconds) DEFLEC09

AA3005 ELLIP HEIGHT- 410.412 (meters) (02/10/07) ADJUSTED

AA3005 GEOID HEIGHT- -28.69 (meters) GEOID09

AA3005

AA3005 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AA3005 Type	PID	Designation	North	East	Ellip
AA3005 NETWORK	AA3005	36 29	1.14	1.00	3.16

AA3005

AA3005.The horizontal coordinates were established by GPS observations

AA3005.and adjusted by the National Geodetic Survey in February 2007.

AA3005

AA3005.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AA3005.See [National Readjustment](#) for more information.

AA3005

AA3005.The horizontal coordinates are valid at the epoch date displayed above

AA3005.which is a decimal equivalence of Year/Month/Day.

AA3005

AA3005.The NAVD 88 height was computed by applying the VERTCON shift value to

AA3005.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)

AA3005

AA3005.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA3005

AA3005.The Laplace correction was computed from DEFLEC09 derived deflections.

AA3005

AA3005.The ellipsoidal height was determined by GPS observations

AA3005.and is referenced to NAD 83.

AA3005

AA3005.The geoid height was determined by GEOID09.

AA3005

AA3005;	North	East	Units	Scale	Factor	Converg.
AA3005;SPC AL E	- 454,937.349	197,932.844	MT	0.99996005	-0 00	46.1
AA3005;UTM 16	- 3,829,559.724	604,908.595	MT	0.99973565	+0 38	59.2

AA3005

AA3005! - Elev Factor x Scale Factor = Combined Factor

AA3005!SPC AL E - 0.99993558 x 0.99996005 = 0.99989563

AA3005!UTM 16 - 0.99993558 x 0.99973565 = 0.99967125

AA3005

AA3005 SUPERSEDED SURVEY CONTROL

AA3005

AA3005 ELLIP H (07/29/02) 410.382 (m) GP() 4 1

AA3005 NAD 83(1992)- 34 36 09.05102(N) 085 51 21.13170(W) AD() 1

AA3005 ELLIP H (03/30/95) 410.486 (m) GP() 4 2

AA3005 NGVD 29 (03/30/95) 439.1 (m) 1441. (f) GPS OBS

AA3005

AA3005.Superseded values are not recommended for survey control.

AA3005.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AA3005.[See file dsdata.txt](#) to determine how the superseded data were derived.

AA3005

AA3005_U.S. NATIONAL GRID SPATIAL ADDRESS: 165FD0490829559(NAD 83)

AA3005

AA3005_MARKER: DD = SURVEY DISK

AA3005_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AA3005_SP_SET: CONCRETE POST

AA3005_STAMPING: 36-29 1993

AA3005_MARK LOGO: ALHD

AA3005_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT

AA3005_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AA3005+STABILITY: SURFACE MOTION

AA3005_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AA3005+SATELLITE: SATELLITE OBSERVATIONS - 1993

AA3005

AA3005 HISTORY - Date Condition Report By

AA3005 HISTORY - 1993 MONUMENTED ALHD

AA3005

AA3005 STATION DESCRIPTION

AA3005

AA3005'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JDS)

AA3005'THE STATION IS LOCATED IN JACKSON COUNTY ON THE NORTH RIGHT OF WAY OF
AA3005'JACKSON COUNTY ROAD NO. 16, ABOUT 3.60 MI (5.79 KM) EAST OF DUTTON AND
AA3005'ABOUT 5.40 MI (8.69 KM) SOUTH OF PISGAH. TO REACH THE STATION FROM THE
AA3005'JUNCTION OF ALA 35 AND ALA 71 (MILE POST 0.00 ON ALA 71 AND MILE POST
AA3005'42.45 ON ALA 35) IN SECTION, DRIVE NORTHEAST ON ALA 71 FOR 5.00 MI
AA3005'(8.05 KM) TO MILE POST 5.00 AND JACKSON COUNTY ROAD NO. 16 ON THE
AA3005'RIGHT AT A HIGH VOLTAGE POWER LINE CROSSING AND A WATER TANK, TURN
AA3005'RIGHT ON JACKSON COUNTY ROAD NO. 16 AND DRIVE SOUTHEAST AND EAST FOR
AA3005'3.45 MI (5.55 KM) TO THE STATION ON THE LEFT. THE STATION IS LOCATED
AA3005'ACROSS JACKSON COUNTY ROAD NO. 16 FROM JACKSON COUNTY ROAD NO. 123
AA3005'SOUTH, 2.8 FT (0.9 M) SOUTH OF A FIVE STRAND BARBED WIRE FENCE ON
AA3005'RUSTY STEEL POSTS, 28.4 FT (8.7 M) WEST-SOUTHWEST OF A CABLE GUY POLE,
AA3005'40.8 FT (12.4 M) NORTH OF THE CENTERLINE OF JACKSON COUNTY ROAD NO.
AA3005'16, 51.8 FT (15.8 M) WEST OF THE SOUTHEAST CORNER OF THE FENCE, 62.4
AA3005'FT (19.0 M) EAST-SOUTHEAST OF A JUNCTION POWER POLE, 64.2 FT (19.6 M)
AA3005'EAST-SOUTHEAST OF A CABLE POLE, 69.8 FT (21.3 M) EAST-SOUTHEAST OF
AA3005'TELEPHONE CABLE PEDESTAL NO. 2 62, 87.5 FT (26.7 M) NORTHWEST OF CABLE
AA3005'POLE NO. 2 143 ACROSS THE ROAD, 3.0 FT (0.9 M) SOUTH OF THE CARSONITE
AA3005'WITNESS POST, AND SET FLUSH WITH THE GROUND. STATION 36-28 1993 MAY BE
AA3005'USED AS AN AZIMUTH FOR THIS STATION.

AA3012 DESIGNATION - 36 36
AA3012 PID - AA3012
AA3012 STATE/COUNTY- AL/JACKSON
AA3012 COUNTRY - US
AA3012 USGS QUAD - DORAN COVE (1988)
AA3012
AA3012 *CURRENT SURVEY CONTROL
AA3012
AA3012* NAD 83(2007) POSITION- 34 53 03.03802(N) 085 51 33.73189(W) ADJUSTED
AA3012* NAD 83(2007) ELLIP HT- 155.798 (meters) (02/10/07) ADJUSTED
AA3012* NAD 83(2007) EPOCH - 2002.00
AA3012* [NAVD 88](#) ORTHO HEIGHT - 184.671 (meters) 605.87 (feet) ADJUSTED
AA3012
AA3012 NAD 83(2007) X - 378,202.220 (meters) COMP
AA3012 NAD 83(2007) Y - -5,224,242.228 (meters) COMP
AA3012 NAD 83(2007) Z - 3,627,423.023 (meters) COMP
AA3012 LAPLACE CORR - -1.05 (seconds) DEFLEC09
AA3012 GEOID HEIGHT - -28.87 (meters) GEOID09
AA3012 DYNAMIC HEIGHT - 184.491 (meters) 605.28 (feet) COMP
AA3012 MODELED GRAVITY - 979,655.7 (mgal) NAVD 88
AA3012
AA3012 VERT ORDER - SECOND CLASS I
AA3012
AA3012 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
AA3012 Type Horiz Ellip Dist(km)
AA3012 -----
AA3012 NETWORK 1.22 2.69
AA3012 -----
AA3012 MEDIAN LOCAL ACCURACY AND DIST (005 points) 1.16 2.72 9.76
AA3012 -----
AA3012 NOTE: Click [here](#) for information on individual local accuracy
AA3012 values and other accuracy information.
AA3012
AA3012
AA3012.The horizontal coordinates were established by GPS observations
AA3012.and adjusted by the National Geodetic Survey in February 2007.
AA3012
AA3012.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
AA3012.See www.ngs.noaa.gov/web/surveys/NSRS2007 for more information.
AA3012
AA3012.The horizontal coordinates are valid at the epoch date displayed above
AA3012.which is a decimal equivalence of Year/Month/Day.
AA3012
AA3012.The orthometric height was determined by differential leveling and
AA3012.adjusted in July 2011.
AA3012
AA3012.No vertical observational check was made to the station.
AA3012
AA3012.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA3012
AA3012.The Laplace correction was computed from DEFLEC09 derived deflections.
AA3012
AA3012.The ellipsoidal height was determined by GPS observations
AA3012.and is referenced to NAD 83.
AA3012
AA3012.The dynamic height is computed by dividing the NAVD 88
AA3012.geopotential number by the normal gravity value computed on the
AA3012.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AA3012.degrees latitude (g = 980.6199 gals.).
AA3012
AA3012.The modeled gravity was interpolated from observed gravity values.
AA3012
AA3012. The following values were computed from the NAD 83(2007) position.
AA3012
AA3012; North East Units Scale Factor Converg.
AA3012;SPC AL E - 486,182.708 197,619.914 MT 0.99996007 -0 00 53.6
AA3012;UTM 16 - 3,860,792.309 604,233.230 MT 0.99973390 +0 39 08.7
AA3012
AA3012! - Elev Factor x Scale Factor = Combined Factor
AA3012!SPC AL E - 0.99997555 x 0.99996007 = 0.99993562
AA3012!UTM 16 - 0.99997555 x 0.99973390 = 0.99970945
AA3012
AA3012: Primary Azimuth Mark Grid Az
AA3012:SPC AL E - 36 37 003 59 12.3
AA3012:UTM 16 - 36 37 003 19 10.0
AA3012
AA3012|-----|
AA3012| PID Reference Object Distance Geod. Az |
AA3012| dddmmss.s |
AA3012| AA3013 36 37 430.935 METERS 0035818.7 |
AA3012|-----|
AA3012
AA3012 SUPERSEDED SURVEY CONTROL
AA3012
AA3012 ELLIP H (07/29/02) 155.781 (m) GP() 4 1
AA3012 NAD 83(1992)- 34 53 03.03775(N) 085 51 33.73146(W) AD() 1
AA3012 ELLIP H (03/30/95) 155.847 (m) GP() 4 2
AA3012 NGVD 29 (03/30/95) 184.7 (m) GEOID93 model used GPS OBS
AA3012
AA3012.Superseded values are not recommended for survey control.
AA3012.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AA3012.[See file dsdata.txt](#) to determine how the superseded data were derived.
AA3012
AA3012_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SFD0423360792(NAD 83)
AA3012
AA3012_MARKER: DD = SURVEY DISK
AA3012_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
AA3012_SP_SET: CONCRETE POST
AA3012_STAMPING: 36-36 1993
AA3012_MARK LOGO: ALHD
AA3012_PROJECTION: FLUSH

AA3012_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT
AA3012_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
AA3012+STABILITY: SURFACE MOTION
AA3012_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AA3012+SATELLITE: SATELLITE OBSERVATIONS - August 10, 2010

AA3012

AA3012 HISTORY	- Date	Condition	Report By
AA3012 HISTORY	- 1993	MONUMENTED	ALHD
AA3012 HISTORY	- 20100810	GOOD	HATMOT

AA3012

AA3012 STATION DESCRIPTION

AA3012

AA3012'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JDS)
AA3012'THE STATION IS LOCATED IN JACKSON COUNTY ON THE WEST RIGHT OF WAY OF
AA3012'ALA 117 IN STEVENSON. TO REACH THE STATION FROM THE JUNCTION OF U.S.
AA3012'72 AND ALA 117 (MILE POST 37.10 ON ALA 117 AND MILE POST 156.75 ON
AA3012'U.S. 72) AT AN INTERCHANGE IN STEVENSON, DRIVE NORTHWEST ON ALA 117
AA3012'FOR 3.40 MI (5.47 KM) TO MILE POST 40.50 AND THE STATION ON THE LEFT.
AA3012'THE STATION IS 32.2 FT (9.8 M) WEST OF THE CENTERLINE OF ALA 117,
AA3012'104.4 FT (31.8 M) SOUTHWEST OF THE SOUTH CROSS TIE POST OF A RUSTY HOG
AA3012'WIRE AND PIPE GATE ACROSS THE ROAD, 113.9 FT (34.7 M) SOUTHWEST OF THE
AA3012'NORTH EIGHT-INCH POST OF A RUSTY HOG WIRE AND PIPE GATE ACROSS THE
AA3012'ROAD, 168.8 FT (51.5 M) NORTH OF TELEPHONE CABLE PEDESTAL NO. P 28,
AA3012'169.0 FT (51.5 M) NORTH OF A TELEPHONE SERVICE AND POWER LINE GUY
AA3012'POLE, 1.6 FT (0.5 M) EAST OF A CARSONITE WITNESS POST, AND SET FLUSH
AA3012'WITH THE GROUND. STATION 36-37 1993 MAY BE USED AS AN AZIMUTH FOR THIS
AA3012'STATION.

AA3012

AA3012 STATION RECOVERY (2010)

AA3012

AA3012'RECOVERY NOTE BY HATCH MOTT MACDONALD 2010 (TLA)
AA3012'RECOVERED IN GOOD CONDITION. NOTE FOLLOWING REVISIONS.
AA3012'
AA3012'MARK IS 119 FT (36.3 M) SOUTHWEST OF AND ACROSS THE ROAD FROM A FENCE
AA3012'CORNER POST ON THE NORTH SIDE OF A GRAVEL DRIVE AND 1.6 FT (0.5 M)
AA3012'EAST OF A METAL WITNESS POST

AA3022 DESIGNATION - 36 47

AA3022 PID - AA3022

AA3022 STATE/COUNTY- AL/JACKSON

AA3022 USGS QUAD - MUD CREEK (1982)

AA3022

AA3022 *CURRENT SURVEY CONTROL

AA3022

AA3022* NAD 83(2007)- 34 51 33.26001(N) 086 06 05.08342(W) ADJUSTED

AA3022* NAVD 88 - 518.6 (meters) 1701. (feet) VERTCON

AA3022

AA3022 EPOCH DATE - 2002.00

AA3022 X - 356,255.643 (meters) COMP

AA3022 Y - -5,227,644.924 (meters) COMP

AA3022 Z - 3,625,344.064 (meters) COMP

AA3022 LAPLACE CORR- -0.20 (seconds) DEFLEC09

AA3022 ELLIP HEIGHT- 489.834 (meters) (02/10/07) ADJUSTED

AA3022 GEOID HEIGHT- -28.59 (meters) GEOID09

AA3022

AA3022 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AA3022 Type PID Designation North East Ellip

AA3022 -----

AA3022 NETWORK AA3022 36 47 1.08 0.90 3.27

AA3022 -----

AA3022

AA3022.The horizontal coordinates were established by GPS observations

AA3022.and adjusted by the National Geodetic Survey in February 2007.

AA3022

AA3022.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AA3022.See [National Readjustment](#) for more information.

AA3022

AA3022.The horizontal coordinates are valid at the epoch date displayed above

AA3022.which is a decimal equivalence of Year/Month/Day.

AA3022

AA3022.The NAVD 88 height was computed by applying the VERTCON shift value to

AA3022.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)

AA3022

AA3022.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA3022

AA3022.The Laplace correction was computed from DEFLEC09 derived deflections.

AA3022

AA3022.The ellipsoidal height was determined by GPS observations

AA3022.and is referenced to NAD 83.

AA3022

AA3022.The geoid height was determined by GEOID09.

AA3022

AA3022; North East Units Scale Factor Converg.

AA3022;SPC AL E - 483,448.672 175,486.698 MT 0.99996740 -0 09 11.6

AA3022;UTM 16 - 3,857,801.538 582,138.985 MT 0.99968315 +0 30 49.1

AA3022

AA3022! - Elev Factor x Scale Factor = Combined Factor

AA3022!SPC AL E - 0.99992312 x 0.99996740 = 0.99989052

AA3022!UTM 16 - 0.99992312 x 0.99968315 = 0.99960629

AA3022

AA3022: Primary Azimuth Mark Grid Az

AA3022:SPC AL E - 36 46 193 24 21.4

AA3022:UTM 16 - 36 46 192 44 20.7

AA3022

AA3022|-----|

AA3022| PID Reference Object Distance Geod. Az |

AA3022| dddmmss.s |

AA3022| AA3021 36 46 402.502 METERS 1931509.8 |

AA3022|-----|

AA3022

AA3022 SUPERSEDED SURVEY CONTROL

AA3022

AA3022 ELLIP H (07/29/02) 489.823 (m) GP() 4 1

AA3022 NAD 83(1992)- 34 51 33.26017(N) 086 06 05.08311(W) AD() 1

AA3022 ELLIP H (03/30/95) 489.889 (m) GP() 4 2

AA3022 NGVD 29 (03/30/95) 518.5 (m) 1701. (f) GPS OBS

AA3022

AA3022.Superseded values are not recommended for survey control.

AA3022.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AA3022.[See file dsdata.txt](#) to determine how the superseded data were derived.

AA3022

AA3022_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SED8213857801(NAD 83)

AA3022

AA3022_MARKER: DD = SURVEY DISK

AA3022_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AA3022_SP_SET: CONCRETE POST

AA3022_STAMPING: 36-47 1993

AA3022_MARK LOGO: ALHD

AA3022_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT

AA3022_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AA3022+STABILITY: SURFACE MOTION

AA3022_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AA3022+SATELLITE: SATELLITE OBSERVATIONS - 1993

AA3022

AA3022 HISTORY - Date Condition Report By

AA3022 HISTORY - 1993 MONUMENTED ALHD

AA3022

AA3022 STATION DESCRIPTION

AA3022

AA3022'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JDS)

AA3022'THE STATION IS LOCATED IN JACKSON COUNTY ON THE EAST RIGHT OF WAY OF
AA3022'ALA 79, ABOUT 3.50 MI (5.63 KM) NORTH-NORTHEAST OF SKYLINE AND ABOUT
AA3022'11.85 MI (19.07 KM) NORTHWEST OF HOLLYWOOD. TO REACH THE STATION FROM
AA3022'THE JUNCTION OF U.S. 72 AND ALA 79 (MILE POST 92.25 ON ALA 79 AND MILE
AA3022'POST 133.40 ON U.S. 72) ON THE WEST SIDE OF SCOTTSBORO, DRIVE NORTH ON
AA3022'ALA 79 FOR 4.95 MI (7.97 KM) TO MILE POST 97.20 AND ALA 35 LEFT AND
AA3022'RIGHT, CONTINUE NORTH ON ALA 79 FOR 12.15 MI (19.55 KM) TO MILE POST
AA3022'109.35 AND ALA 146 ON THE LEFT, CONTINUE NORTH ON ALA 79 FOR 0.55 MI
AA3022'(0.89 KM) TO MILE POST 109.90 AND THE STATION ON THE RIGHT. THE
AA3022'STATION IS 2.9 FT (0.9 M) WEST OF A FIVE STRAND BARBED WIRE FENCE ON

AA3022'OLD WOOD POSTS, 34.0 FT (10.4 M) SOUTH OF AN UNUSED GRAVEL FIELD ROAD,
AA3022'38.0 FT (11.6 M) SOUTHEAST OF THE SOUTH END OF A FIFTEEN-INCH
AA3022'CORREGATED METAL PIPE UNDER A GRAVEL FIELD ROAD, 50.0 FT (15.2 M)
AA3022'SOUTH OF A FENCE JUNCTION, 54.0 FT (16.5 M) EAST OF THE CENTERLINE OF
AA3022'ALA 79, 129.0 FT (39.3 M) NORTHEAST OF THE NORTHEAST CORNER OF A
AA3022'GREENHOUSE ACROSS THE ROAD, 3.0 FT (0.9 M) WEST OF A CARSONITE WITNESS
AA3022'POST, AND SET FLUSH WITH THE GROUND. STATION 36-46 1993 MAY BE USED AS
AA3022'AN AZIMUTH FOR THIS STATION.

AA3023 DESIGNATION - 36 48

AA3023 PID - AA3023

AA3023 STATE/COUNTY- AL/JACKSON

AA3023 USGS QUAD - MUD CREEK (1982)

AA3023

AA3023 *CURRENT SURVEY CONTROL

AA3023

AA3023* NAD 83(2007)- 34 46 41.34689(N) 086 07 03.12102(W) ADJUSTED

AA3023* NAVD 88 - 477.9 (meters) 1568. (feet) VERTCON

AA3023

AA3023 EPOCH DATE - 2002.00

AA3023 X - 355,130.246 (meters) COMP

AA3023 Y - -5,232,836.506 (meters) COMP

AA3023 Z - 3,617,935.246 (meters) COMP

AA3023 LAPLACE CORR- -1.22 (seconds) DEFLEC09

AA3023 ELLIP HEIGHT- 449.123 (meters) (02/10/07) ADJUSTED

AA3023 GEOID HEIGHT- -28.67 (meters) GEOID09

AA3023

AA3023 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----

AA3023 Type PID Designation North East Ellip

AA3023 -----

AA3023 NETWORK AA3023 36 48 0.94 0.78 2.41

AA3023 -----

AA3023

AA3023.The horizontal coordinates were established by GPS observations

AA3023.and adjusted by the National Geodetic Survey in February 2007.

AA3023

AA3023.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AA3023.See [National Readjustment](#) for more information.

AA3023

AA3023.The horizontal coordinates are valid at the epoch date displayed above

AA3023.which is a decimal equivalence of Year/Month/Day.

AA3023

AA3023.The NAVD 88 height was computed by applying the VERTCON shift value to

AA3023.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)

AA3023

AA3023.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA3023

AA3023.The Laplace correction was computed from DEFLEC09 derived deflections.

AA3023

AA3023.The ellipsoidal height was determined by GPS observations

AA3023.and is referenced to NAD 83.

AA3023

AA3023.The geoid height was determined by GEOID09.

AA3023

AA3023; North East Units Scale Factor Converg.

AA3023;SPC AL E - 474,457.487 173,987.052 MT 0.99996834 -0 09 43.6

AA3023;UTM 16 - 3,848,796.103 580,744.377 MT 0.99968035 +0 30 12.2

AA3023

AA3023! - Elev Factor x Scale Factor = Combined Factor

AA3023!SPC AL E - 0.99992951 x 0.99996834 = 0.99989785

AA3023!UTM 16 - 0.99992951 x 0.99968035 = 0.99960988

AA3023

PID	Reference Object	Distance	Geod. Az
AA3023	AA3024 36 49	394.560 METERS	35247

AA3023

AA3023 SUPERSEDED SURVEY CONTROL

AA3023

AA3023 ELLIP H (07/29/02) 449.105 (m) GP() 4 1
AA3023 NAD 83(1992)- 34 46 41.34695(N) 086 07 03.12062(W) AD() 1
AA3023 ELLIP H (03/30/95) 449.184 (m) GP() 4 2
AA3023 NGVD 29 (03/30/95) 477.9 (m) 1568. (f) GPS OBS

AA3023

AA3023.Superseded values are not recommended for survey control.
AA3023.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AA3023.[See file dsdata.txt](#) to determine how the superseded data were derived.

AA3023

AA3023_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SED8074448796(NAD 83)

AA3023

AA3023_MARKER: DD = SURVEY DISK
AA3023_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
AA3023_SP_SET: CONCRETE POST
AA3023_STAMPING: 36-48 1993
AA3023_MARK LOGO: ALHD
AA3023_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT
AA3023_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
AA3023+STABILITY: SURFACE MOTION
AA3023_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AA3023+SATELLITE: SATELLITE OBSERVATIONS - 1993

AA3023

HISTORY	Date	Condition	Report By
AA3023 HISTORY	- 1993	MONUMENTED	ALHD

AA3023

AA3023 STATION DESCRIPTION

AA3023

AA3023'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JDS)
AA3023'THE STATION IS LOCATED IN JACKSON COUNTY ON THE EAST RIGHT OF WAY OF
AA3023'ALA 79 IN SKYLINE. TO REACH THE STATION FROM THE JUNCTION OF U.S. 72
AA3023'AND ALA 79 (MILE POST 92.25 ON ALA 79 AND MILE POST 133.40 ON U.S. 72)
AA3023'ON THE WEST SIDE OF SCOTTSBORO, DRIVE NORTH ON ALA 79 FOR 4.95 MI
AA3023'(7.97 KM) TO MILE POST 97.20 AND ALA 35 LEFT AND RIGHT, CONTINUE NORTH
AA3023'ON ALA 79 FOR 6.90 MI (11.10 KM) TO MILE POST 104.10 AND THE STATION
AA3023'ON THE RIGHT. THE STATION IS 39.2 FT (11.9 M) NORTHEAST OF A SPEED
AA3023'LIMIT 55 SIGN, 53.0 FT (16.2 M) EAST OF THE CENTERLINE OF ALA 79, 56.7
AA3023'FT (17.3 M) NORTH-NORTHWEST OF A CABLE POLE, 1.8 FT (0.5 M) WEST OF A
AA3023'CARSONITE WITNESS POST, AND SET FLUSH WITH THE GROUND. STATION 36-49
AA3023'1993 MAY BE USED AS AN AZIMUTH FOR THIS STATION.

AA3039 FBN - This is a Federal Base Network Control Station.

AA3039 DESIGNATION - 36 64

AA3039 PID - AA3039

AA3039 STATE/COUNTY- AL/JACKSON

AA3039 COUNTRY - US

AA3039 USGS QUAD - GRANT (1982)

AA3039

AA3039 *CURRENT SURVEY CONTROL

AA3039

AA3039* NAD 83(2007) POSITION- 34 36 24.71947(N) 086 15 10.47843(W) ADJUSTED

AA3039* NAD 83(2007) ELLIP HT- 157.299 (meters) (02/10/07) ADJUSTED

AA3039* NAD 83(2007) EPOCH - 2002.00

AA3039* [NAVD 88](#) ORTHO HEIGHT - 186.223 (meters) 610.97 (feet) ADJUSTED

AA3039

AA3039 NAD 83(2007) X - 343,456.397 (meters) COMP

AA3039 NAD 83(2007) Y - -5,244,214.096 (meters) COMP

AA3039 NAD 83(2007) Z - 3,602,144.994 (meters) COMP

AA3039 LAPLACE CORR - 0.44 (seconds) DEFLEC09

AA3039 GEOID HEIGHT - -28.93 (meters) GEOID09

AA3039 DYNAMIC HEIGHT - 186.035 (meters) 610.35 (feet) COMP

AA3039 MODELED GRAVITY - 979,621.2 (mgal) NAVD 88

AA3039

AA3039 VERT ORDER - SECOND CLASS I

AA3039

AA3039 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)

AA3039 Type Horiz Ellip Dist(km)

AA3039 -----

AA3039 NETWORK 0.99 2.27

AA3039 -----

AA3039 MEDIAN LOCAL ACCURACY AND DIST (124 points) 1.24 2.86 224.90

AA3039 -----

AA3039 NOTE: Click [here](#) for information on individual local accuracy

AA3039 values and other accuracy information.

AA3039

AA3039

AA3039.The horizontal coordinates were established by GPS observations

AA3039.and adjusted by the National Geodetic Survey in February 2007.

AA3039

AA3039.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).

AA3039.See www.ngs.noaa.gov/web/surveys/NSRS2007 for more information.

AA3039

AA3039.The horizontal coordinates are valid at the epoch date displayed above

AA3039.which is a decimal equivalence of Year/Month/Day.

AA3039

AA3039.The orthometric height was determined by differential leveling and

AA3039.adjusted in September 2008.

AA3039

AA3039.No vertical observational check was made to the station.

AA3039

AA3039.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA3039

AA3039.The Laplace correction was computed from DEFLECO9 derived deflections.

AA3039

AA3039.The ellipsoidal height was determined by GPS observations

AA3039.and is referenced to NAD 83.

AA3039

AA3039.The dynamic height is computed by dividing the NAVD 88

AA3039.geopotential number by the normal gravity value computed on the

AA3039.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

AA3039.degrees latitude (g = 980.6199 gals.).

AA3039

AA3039.The modeled gravity was interpolated from observed gravity values.

AA3039

AA3039. The following values were computed from the NAD 83(2007) position.

AA3039

AA3039; North East Units Scale Factor Converg.

AA3039;SPC AL E - 455,499.937 161,516.680 MT 0.99997825 -0 14 17.9

AA3039;UTM 16 - 3,829,701.109 568,498.281 MT 0.99965783 +0 25 27.6

AA3039

AA3039! - Elev Factor x Scale Factor = Combined Factor

AA3039!SPC AL E - 0.99997531 x 0.99997825 = 0.99995356

AA3039!UTM 16 - 0.99997531 x 0.99965783 = 0.99963315

AA3039

AA3039 SUPERSEDED SURVEY CONTROL

AA3039

AA3039 NAD 83(1992)- 34 36 24.71970(N) 086 15 10.47849(W) AD() A

AA3039 ELLIP H (08/29/05) 157.330 (m) GP() 4 1

AA3039 ELLIP H (07/29/02) 157.269 (m) GP() 4 1

AA3039 NAD 83(1992)- 34 36 24.71954(N) 086 15 10.47852(W) AD() 1

AA3039 ELLIP H (03/30/95) 157.361 (m) GP() 4 2

AA3039 NAVD 88 (08/29/05) 186.3 (m) GEOID03 model used GPS OBS

AA3039 NGVD 29 (03/30/95) 186.2 (m) GEOID93 model used GPS OBS

AA3039

AA3039.Superseded values are not recommended for survey control.

AA3039.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AA3039.[See file dsdata.txt](#) to determine how the superseded data were derived.

AA3039

AA3039_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SED6849829701(NAD 83)

AA3039

AA3039_MARKER: DD = SURVEY DISK

AA3039_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AA3039_SP_SET: CONCRETE POST

AA3039_STAMPING: 36-64 1993

AA3039_MARK LOGO: ALHD

AA3039_PROJECTION: FLUSH

AA3039_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT

AA3039_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AA3039+STABILITY: SURFACE MOTION

AA3039_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AA3039+SATELLITE: SATELLITE OBSERVATIONS - October 03, 2007

AA3039

AA3039 HISTORY - Date Condition Report By

AA3039 HISTORY - 1993 MONUMENTED ALHD

AA3039 HISTORY - 20040401 GOOD ALHD
AA3039 HISTORY - 20040624 GOOD ALPCO
AA3039 HISTORY - 20071003 GOOD MAPTEC

AA3039

AA3039 STATION DESCRIPTION

AA3039

AA3039'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JDS)
AA3039'THE STATION IS LOCATED IN JACKSON COUNTY ON THE SOUTH RIGHT OF WAY OF
AA3039'U.S. 72, ABOUT 1.70 MI (2.74 KM) SOUTHEAST OF WOODVILLE AND ABOUT
AA3039'13.30 MI (21.40 KM) SOUTHWEST OF SCOTTSBORO. TO REACH THE STATION FROM
AA3039'THE JUNCTION OF U.S. 72 AND ALA 79 (MILE POST 133.40 ON U.S. 72 AND
AA3039'MILE POST 92.25 ON ALA 79) ON THE WEST SIDE OF SCOTTSBORO, DRIVE WEST
AA3039'ON U.S. 72 FOR 9.35 MI (15.05 KM) TO MILE POST 124.05 AND THE STATION
AA3039'ON THE LEFT. THE STATION IS 4.8 FT (1.5 M) NORTH-NORTHWEST OF A HOG
AA3039'WIRE FENCE WITH ONE STRAND OF BARBED WIRE ON FOUR BY FOUR-INCH WOOD
AA3039'POSTS, 57.4 FT (17.5 M) EAST-NORTHEAST OF THE EAST ONE OF THREE
AA3039'CONNECTED POSTS IN THE FENCE LINE, 106.7 FT (32.5 M) SOUTH-SOUTHEAST
AA3039'OF THE CENTERLINE OF THE EAST BOUND LANES OF U.S. 72, 134.8 FT (41.1
AA3039'M) EAST-NORTHEAST OF A TELEPHONE SERVICE POLE, 166.9 FT (50.9 M)
AA3039'WEST-SOUTHWEST OF THE NORTHEAST CORNER OF THE FENCE, 179.0 FT (54.6 M)
AA3039'WEST-SOUTHWEST OF THE CENTER OF A GRAVEL DRIVEWAY, 219.8 FT (67.0 M)
AA3039'EAST OF MILE POST 124 ON THE SOUTH SIDE OF U. S. 72, 251.5 FT (76.7 M)
AA3039'EAST-NORTHEAST OF A TRANSFORMER POWER POLE WITH AN ELECTRIC METER,
AA3039'254.0 FT (77.4 M) EAST-NORTHEAST OF THE CENTER OF A GRAVEL DRIVEWAY,
AA3039'4.6 FT (1.4 M) NORTHWEST OF A CARSONITE WITNESS POST, AND SET FLUSH
AA3039'WITH THE GROUND. STATION 36-65 1993 MAY BE USED AS AN AZIMUTH FOR THIS
AA3039'STATION.

AA3039

AA3039 STATION RECOVERY (2004)

AA3039

AA3039'RECOVERY NOTE BY ALABAMA HIGHWAY DEPARTMENT 2004 (JDS)
AA3039'RECOVERED IN GOOD CONDITION.

AA3039

AA3039 STATION RECOVERY (2004)

AA3039

AA3039'RECOVERY NOTE BY ALABAMA POWER COMPANY 2004 (KSB)
AA3039'RECOVERED AS DESCRIBED.

AA3039

AA3039 STATION RECOVERY (2007)

AA3039

AA3039'RECOVERY NOTE BY MAPTECH INCORPORATED 2007 (MAP)
AA3039'RECOVERED AS DESCRIBED.

AA3052 FBN - This is a Federal Base Network Control Station.

AA3052 DESIGNATION - 48 13

AA3052 PID - AA3052

AA3052 STATE/COUNTY- AL/MARSHALL

AA3052 COUNTRY - US

AA3052 USGS QUAD - BOAZ (1983)

AA3052

AA3052 *CURRENT SURVEY CONTROL

AA3052

AA3052* NAD 83(2007) POSITION- 34 13 55.83046(N) 086 12 16.21477(W) ADJUSTED
 AA3052* NAD 83(2007) ELLIP HT- 294.226 (meters) (02/10/07) ADJUSTED
 AA3052* NAD 83(2007) EPOCH - 2002.00
 AA3052* [NAVD 88](#) ORTHO HEIGHT - 323.311 (meters) 1060.73 (feet) ADJUSTED

AA3052
 AA3052 NAD 83(2007) X - 349,449.613 (meters) COMP
 AA3052 NAD 83(2007) Y - -5,267,478.282 (meters) COMP
 AA3052 NAD 83(2007) Z - 3,567,933.799 (meters) COMP
 AA3052 LAPLACE CORR - 0.83 (seconds) DEFLEC09
 AA3052 GEOID HEIGHT - -29.08 (meters) GEOID09
 AA3052 DYNAMIC HEIGHT - 322.964 (meters) 1059.59 (feet) COMP
 AA3052 MODELED GRAVITY - 979,553.7 (mgal) NAVD 88

AA3052
 AA3052 VERT ORDER - SECOND CLASS I
 AA3052
 AA3052 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
 AA3052 Type Horiz Ellip Dist(km)
 AA3052 -----
 AA3052 NETWORK 0.79 1.71
 AA3052 -----
 AA3052 MEDIAN LOCAL ACCURACY AND DIST (135 points) 1.10 2.47 212.46
 AA3052 -----

AA3052 NOTE: Click [here](#) for information on individual local accuracy
 AA3052 values and other accuracy information.
 AA3052
 AA3052
 AA3052.The horizontal coordinates were established by GPS observations
 AA3052.and adjusted by the National Geodetic Survey in February 2007.
 AA3052
 AA3052.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 AA3052.See www.ngs.noaa.gov/web/surveys/NSRS2007 for more information.
 AA3052
 AA3052.The horizontal coordinates are valid at the epoch date displayed above
 AA3052.which is a decimal equivalence of Year/Month/Day.
 AA3052
 AA3052.The orthometric height was determined by differential leveling and
 AA3052.adjusted in September 2008.
 AA3052
 AA3052.No vertical observational check was made to the station.
 AA3052
 AA3052.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 AA3052
 AA3052.The Laplace correction was computed from DEFLEC09 derived deflections.
 AA3052
 AA3052.The ellipsoidal height was determined by GPS observations
 AA3052.and is referenced to NAD 83.
 AA3052
 AA3052.The dynamic height is computed by dividing the NAVD 88
 AA3052.geopotential number by the normal gravity value computed on the
 AA3052.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AA3052.degrees latitude (g = 980.6199 gals.).
 AA3052

AA3052.The modeled gravity was interpolated from observed gravity values.
AA3052
AA3052. The following values were computed from the NAD 83(2007) position.
AA3052
AA3052; North East Units Scale Factor Converg.
AA3052;SPC AL E - 413,919.370 165,804.322 MT 0.99997441 -0 12 31.7
AA3052;UTM 16 - 3,788,185.700 573,262.724 MT 0.99966616 +0 26 51.1
AA3052
AA3052! - Elev Factor x Scale Factor = Combined Factor
AA3052!SPC AL E - 0.99995381 x 0.99997441 = 0.99992823
AA3052!UTM 16 - 0.99995381 x 0.99966616 = 0.99961999
AA3052
AA3052: Primary Azimuth Mark Grid Az
AA3052:SPC AL E - 48 12 169 59 37.1
AA3052:UTM 16 - 48 12 169 20 14.3
AA3052
AA3052|-----|
AA3052| PID Reference Object Distance Geod. Az |
AA3052| ddmmss.s |
AA3052| AA3051 48 12 422.593 METERS 1694705.4 |
AA3052|-----|
AA3052
AA3052 SUPERSEDED SURVEY CONTROL
AA3052
AA3052 NAD 83(1992)- 34 13 55.83046(N) 086 12 16.21464(W) AD() A
AA3052 ELLIP H (08/29/05) 294.246 (m) GP() 4 1
AA3052 ELLIP H (07/29/02) 294.202 (m) GP() 4 1
AA3052 NAD 83(1992)- 34 13 55.83070(N) 086 12 16.21512(W) AD() 1
AA3052 ELLIP H (03/30/95) 294.283 (m) GP() 4 2
AA3052 NAVD 88 (08/29/05) 323.3 (m) GEOID03 model used GPS OBS
AA3052 NGVD 29 (03/30/95) 323.3 (m) GEOID93 model used GPS OBS
AA3052
AA3052.Superseded values are not recommended for survey control.
AA3052.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AA3052.[See file dsdata.txt](#) to determine how the superseded data were derived.
AA3052
AA3052_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SEC7326288185(NAD 83)
AA3052
AA3052_MARKER: DD = SURVEY DISK
AA3052_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
AA3052_SP_SET: CONCRETE POST
AA3052_STAMPING: 48-13 1993
AA3052_MARK LOGO: ALHD
AA3052_PROJECTION: FLUSH
AA3052_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT
AA3052_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
AA3052+STABILITY: SURFACE MOTION
AA3052_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AA3052+SATELLITE: SATELLITE OBSERVATIONS - March 17, 2008
AA3052
AA3052 HISTORY - Date Condition Report By
AA3052 HISTORY - 1993 MONUMENTED ALHD

AA3052 HISTORY - 20010626 GOOD ALHD
AA3052 HISTORY - 20040331 GOOD ALHD
AA3052 HISTORY - 20040622 GOOD LOCSUR
AA3052 HISTORY - 20070913 GOOD MAPTEC
AA3052 HISTORY - 20080317 GOOD ALADT

AA3052

AA3052 STATION DESCRIPTION

AA3052

AA3052'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JLB)

AA3052'THE STATION IS IN MARSHALL COUNTY ON THE EAST RIGHT OF WAY OF A PAVED
AA3052'COUNTY ROAD IN ALBERTVILLE. TO REACH THE STATION FROM THE JUNCTION OF
AA3052'U.S. 431 AND AL 75 (MILEPOST 294.32 ON U.S. 431 AND MILEPOST 58.92 ON
AA3052'AL 75) IN ALBERTVILLE, DRIVE SOUTHWEST ON AL 75 FOR 1.05 MI (1.69 KM)
AA3052'TO MILEPOST 57.85 AND A FIVE WAY INTERSECTION AT A TRAFFIC LIGHT. BEAR
AA3052'LEFT ON BROAD STREET AND DRIVE SOUTH FOR 2.15 MI (3.46 KM) TO THE
AA3052'STATION ON THE LEFT. THE STATION IS 2.8 FT (0.9 M) WEST OF A FOUR
AA3052'STRAND BARBED WIRE FENCE ON RUSTY GREEN METAL POSTS WITH WHITE TOPS,
AA3052'21.8 FT (6.6 M) EAST OF THE CENTERLINE OF THE PAVED COUNTY ROAD, 56.4
AA3052'FT (17.2 M) EAST-SOUTHEAST OF A COMMUNITY WATCH SIGN ACROSS THE ROAD,
AA3052'80.5 FT (24.5 M) SOUTHEAST OF THE CENTER OF A GRAVEL DRIVEWAY LEADING
AA3052'TO A BROWN WOOD FRAME HOUSE WITH A BROWN SHINGLE ROOF ACROSS THE ROAD,
AA3052'88.7 FT (27.0 M) SOUTH OF THE CENTER OF A GRAVEL DRIVEWAY LEADING TO A
AA3052'DOUBLE METAL GATE, 96.5 FT (29.4 M) SOUTHEAST OF A JUNCTION POWER AND
AA3052'CABLE POLE WITH ONE TRANSFORMER ACROSS THE ROAD, 101.0 FT (30.8 M)
AA3052'SOUTH OF THE CENTER OF A DOUBLE METAL GATE LEADING INTO A FIELD, 117.6
AA3052'FT (35.8 M) SOUTH OF A POWER POLE, 3.1 FT (0.9 M) WEST OF A CARSONITE
AA3052'WITNESS POST AND SET FLUSH WITH THE GROUND. STATION 48-12 1993 MAY BE
AA3052'USED AS AN AZIMUTH FOR THIS STATION.

AA3052

AA3052 STATION RECOVERY (2001)

AA3052

AA3052'RECOVERY NOTE BY ALABAMA HIGHWAY DEPARTMENT 2001 (JDS)

AA3052'RECOVERED IN GOOD CONDITION.

AA3052

AA3052 STATION RECOVERY (2004)

AA3052

AA3052'RECOVERY NOTE BY ALABAMA HIGHWAY DEPARTMENT 2004 (JDS)

AA3052'RECOVERED IN GOOD CONDITION.

AA3052

AA3052 STATION RECOVERY (2004)

AA3052

AA3052'RECOVERY NOTE BY LOCAL SURVEYOR (INDIVIDUAL OR FIRM) 2004 (JJB)

AA3052'RECOVERED AS DESCRIBED.

AA3052

AA3052 STATION RECOVERY (2007)

AA3052

AA3052'RECOVERY NOTE BY MAPTECH INCORPORATED 2007 (MAP)

AA3052'RECOVERED AS DESCRIBED.

AA3052

AA3052 STATION RECOVERY (2008)

AA3052

AA3052'RECOVERY NOTE BY ALABAMA DEPT OF TRANSPORTATION 2008 (JDS)

AA3052'RECOVERED IN GOOD CONDITION.

AA3047 DESIGNATION - 48 8
AA3047 PID - AA3047
AA3047 STATE/COUNTY- AL/MARSHALL
AA3047 COUNTRY - US
AA3047 USGS QUAD - ARAB (1973)
AA3047
AA3047 *CURRENT SURVEY CONTROL
AA3047
AA3047* NAD 83(2007) POSITION- 34 15 32.46740(N) 086 25 31.47258(W) ADJUSTED
AA3047* NAD 83(2007) ELLIP HT- 172.050 (meters) (02/10/07) ADJUSTED
AA3047* NAD 83(2007) EPOCH - 2002.00
AA3047* [NAVD 88](#) ORTHO HEIGHT - 201.005 (meters) 659.46 (feet) ADJUSTED
AA3047
AA3047 NAD 83(2007) X - 329,027.430 (meters) COMP
AA3047 NAD 83(2007) Y - -5,267,013.177 (meters) COMP
AA3047 NAD 83(2007) Z - 3,570,326.580 (meters) COMP
AA3047 LAPLACE CORR - -3.19 (seconds) DEFLEC09
AA3047 GEOID HEIGHT - -28.95 (meters) GEOID09
AA3047 DYNAMIC HEIGHT - 200.794 (meters) 658.77 (feet) COMP
AA3047 MODELED GRAVITY - 979,580.1 (mgal) NAVD 88
AA3047
AA3047 VERT ORDER - SECOND CLASS I
AA3047
AA3047 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
AA3047 Type Horiz Ellip Dist(km)
AA3047 -----
AA3047 NETWORK 0.91 1.92
AA3047 -----
AA3047 MEDIAN LOCAL ACCURACY AND DIST (006 points) 1.06 2.00 11.79
AA3047 -----
AA3047 NOTE: Click [here](#) for information on individual local accuracy
AA3047 values and other accuracy information.
AA3047
AA3047
AA3047.The horizontal coordinates were established by GPS observations
AA3047.and adjusted by the National Geodetic Survey in February 2007.
AA3047
AA3047.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
AA3047.See www.ngs.noaa.gov/web/surveys/NSRS2007 for more information.
AA3047
AA3047.The horizontal coordinates are valid at the epoch date displayed above
AA3047.which is a decimal equivalence of Year/Month/Day.
AA3047
AA3047.The orthometric height was determined by differential leveling and
AA3047.adjusted in September 2008.
AA3047
AA3047.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AA3047
AA3047.The Laplace correction was computed from DEFLEC09 derived deflections.
AA3047
AA3047.The ellipsoidal height was determined by GPS observations

AA3047.and is referenced to NAD 83.

AA3047

AA3047.The dynamic height is computed by dividing the NAVD 88

AA3047.geopotential number by the normal gravity value computed on the

AA3047.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

AA3047.degrees latitude (g = 980.6199 gals.).

AA3047

AA3047.The modeled gravity was interpolated from observed gravity values.

AA3047

AA3047. The following values were computed from the NAD 83(2007) position.

AA3047

AA3047; North East Units Scale Factor Converg.

AA3047:SPC AL E - 416,993.227 145,469.616 MT 0.99999664 -0 19 59.9

AA3047:UTM 16 - 3,791,025.393 552,900.958 MT 0.99963450 +0 19 24.5

AA3047

AA3047! - Elev Factor x Scale Factor = Combined Factor

AA3047!SPC AL E - 0.99997299 x 0.99999664 = 0.99996963

AA3047!UTM 16 - 0.99997299 x 0.99963450 = 0.99960750

AA3047

AA3047: Primary Azimuth Mark Grid Az

AA3047:SPC AL E - 48 9 044 19 13.4

AA3047:UTM 16 - 48 9 043 39 49.0

AA3047

AA3047|-----|

AA3047| PID Reference Object Distance Geod. Az |

AA3047| | dddmmss.s |

AA3047| AA3048 48 9 458.009 METERS 0435913.5 |

AA3047|-----|

AA3047

AA3047 SUPERSEDED SURVEY CONTROL

AA3047

AA3047 ELLIP H (07/29/02) 172.019 (m) GP() 4 1

AA3047 NAD 83(1992)- 34 15 32.46773(N) 086 25 31.47257(W) AD() 1

AA3047 ELLIP H (03/30/95) 172.104 (m) GP() 4 2

AA3047 NGVD 29 (03/30/95) 201.0 (m) GEOID93 model used GPS OBS

AA3047

AA3047.Superseded values are not recommended for survey control.

AA3047.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AA3047.[See file dsdata.txt](#) to determine how the superseded data were derived.

AA3047

AA3047_U.S. NATIONAL GRID SPATIAL ADDRESS: 16SEC5290091025(NAD 83)

AA3047

AA3047_MARKER: DD = SURVEY DISK

AA3047_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AA3047_SP_SET: CONCRETE POST

AA3047_STAMPING: 48-8 1993

AA3047_MARK LOGO: ALHD

AA3047_PROJECTION: FLUSH

AA3047_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT

AA3047_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AA3047+STABILITY: SURFACE MOTION

AA3047_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AA3047+SATELLITE: SATELLITE OBSERVATIONS - August 09, 2007

AA3047

AA3047 HISTORY	- Date	Condition	Report By
AA3047 HISTORY	- 1993	MONUMENTED	ALHD
AA3047 HISTORY	- 20040331	GOOD	ALHD
AA3047 HISTORY	- 20070809	GOOD	MAPTEC

AA3047

AA3047 STATION DESCRIPTION

AA3047

AA3047'DESCRIBED BY ALABAMA HIGHWAY DEPARTMENT 1993 (JLB)

AA3047'THE STATION IS IN MARSHALL COUNTY ON THE NORTH RIGHT OF WAY OF A PAVED
AA3047'COUNTY ROAD ABOUT 5.60 MI (9.01 KM) SOUTHEAST OF ARAB AND ABOUT 9.20
AA3047'MI (14.81 KM) SOUTHWEST OF GUNTERSVILLE. TO REACH THE STATION FROM THE
AA3047'JUNCTION OF U.S. 431 AND AL 79 SOUTH (MILEPOST 302.25 ON U.S. 431 AND
AA3047'MILEPOST 66.19 ON AL 79) IN GUNTERSVILLE, DRIVE SOUTHWEST ON AL 79 FOR
AA3047'1.85 MI (2.98 KM) TO MILEPOST 64.35 AND A PAVED COUNTY ROAD RIGHT.
AA3047'TURN RIGHT ON THE PAVED COUNTY ROAD AND DRIVE WEST AND SOUTHWEST FOR
AA3047'5.00 MI (8.05 KM) TO A T-INTERSECTION WITH MARSHALL COUNTY ROAD 14
AA3047'LEFT AND RIGHT. TURN LEFT ON MARSHALL COUNTY ROAD 14 AND DRIVE
AA3047'SOUTHWEST FOR 2.30 MI (3.70 KM) TO A PAVED COUNTY ROAD RIGHT. TURN
AA3047'RIGHT ON THE PAVED COUNTY ROAD AND DRIVE WEST FOR 0.15 MI (0.24 KM) TO
AA3047'THE STATION ON THE RIGHT. THE STATION IS 3.8 FT (1.2 M) SOUTH OF A
AA3047'FIVE STRAND STRAIGHT WIRE FENCE ON WOOD POSTS, 22.1 FT (6.7 M) NORTH
AA3047'OF THE CENTER OF A PAVED COUNTY ROAD, 136.5 FT (41.6 M) WEST OF A
AA3047'POWER AND CABLE POLE, 178.0 FT (54.3 M) EAST OF A POWER AND CABLE
AA3047'POLE, 195.4 FT (59.6 M) EAST OF A GRAVEL DRIVEWAY LEADING TO A GRAY
AA3047'WOOD FRAME HOUSE WITH A TIN ROOF, 3.8 FT (1.2 M) WEST OF A CARSONITE
AA3047'WITNESS POST AND SET FLUSH WITH THE GROUND. STATION 48-9 1993 MAY BE
AA3047'USED AS AN AZIMUTH FOR THIS STATION.

AA3047

AA3047 STATION RECOVERY (2004)

AA3047

AA3047'RECOVERY NOTE BY ALABAMA HIGHWAY DEPARTMENT 2004 (JDS)

AA3047'RECOVERED IN GOOD CONDITION.

AA3047

AA3047 STATION RECOVERY (2007)

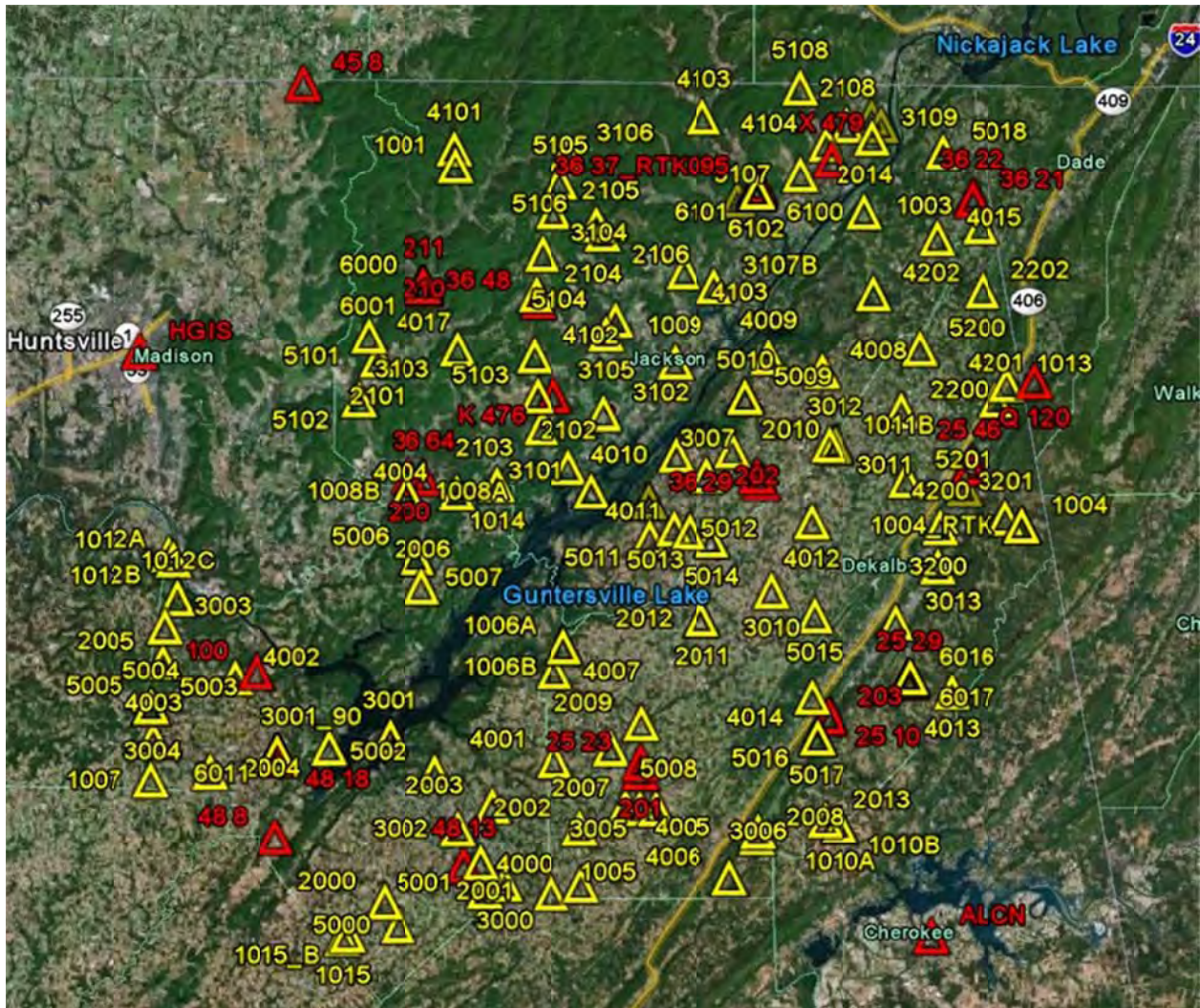
AA3047

AA3047'RECOVERY NOTE BY MAPTECH INCORPORATED 2007 (MAP)

AA3047'RECOVERED AS DESCRIBED.

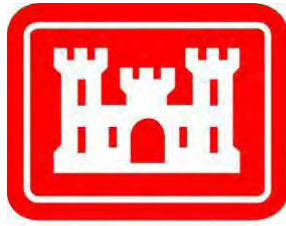
SECTION 5: GPS CONTROL DIAGRAM

This section contains a graphical representation of the new and existing control stations used for the Jackson, Marshall and DeKalb Counties Airborne LiDAR Survey Project. Stations shown in red are the GPS base stations and geodetic control used.



Not To Scale

AIRBORNE LIDAR REPORT



**US Army Corps
of Engineers®**

JACKSON, MARSHALL, AND DEKALB COUNTIES, AL
US ARMY CORPS OF ENGINEERS—MOBILE, ALABAMA

Woolpert Project Number: 71899
August 2012



AIRBORNE LIDAR TASK ORDER REPORT

MARSHALL, JACKSON, AND DEKALB COUNTIES, ALABAMA LIDAR

WOOLPERT PROJECT #71899

For:

United States Army Corps of Engineers
(USACE)
Mobile District P.O. Box 228
St. Joseph Street
Mobile, Alabama 36628

By:

Woolpert
4454 Idea Center Boulevard
Dayton, OH 45430-1500
Tel 937.461.5660

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Section 2	Acquisition
Section 3	LiDAR Data Processing
Section 4	Hydrologic Flattening and Final Quality Control
Section 5	Final Accuracy Assessment
Section 6	Final Deliverables

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SECTION 1: OVERVIEW

PROJECT NAME: JACKSON, MARSHALL, DEKALB COUNTY, ALABAMA LIDAR

WOOLPERT PROJECT #71899

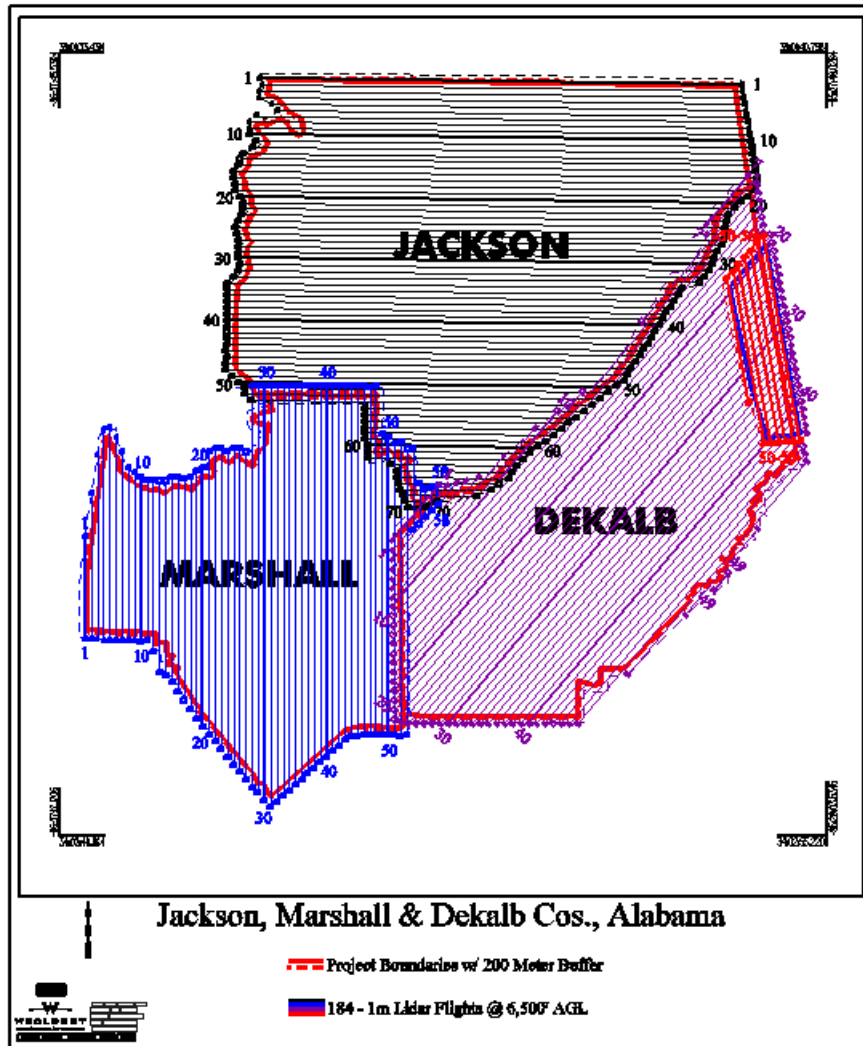
This report contains a comprehensive outline of the airborne LiDAR data acquisition consisting of Jackson, Marshall and DeKalb Counties in Alabama, for the United States Army Corps of Engineers Mobile Division (USACE). The LiDAR was collected and processed to meet a maximum Nominal Post Spacing (NPS) of 1 meter. The NPS assessment is made against single swath, first return data located within the geometrically usable center portion (typically ~90%) of each swath.

The data was collected using a Leica ALS60 200 kHz Multiple Pulses in Air (MPIA) LiDAR sensor installed in a shock isolator sled mount. The ALS60 200 kHz sensor collects up to four returns (echos) per pulse, recording attributes such as time stamp and intensity data, for the first three returns. If a fourth return was captured, the system does not record an associated intensity value. The aerial LiDAR was collected at the following sensor specifications:

Post Spacing (Minimum):	3.28 ft / 1 m
AGL (Above Ground Level) average flying height:	6,500 ft / 1,981 m
MSL (Mean Sea Level) average flying height:	7,050 ft / 2,149 m
*note: DeKalb County flights 50-56 flown at 8,400' MSL	
Average Ground Speed:	130 knots / 150 mph
Field of View (full):	40 degrees
Pulse Rate:	115.6 kHz
Scan Rate:	41.8 Hz
Side Lap (Minimum):	25%

LiDAR data was processed and projected in State Plane Alabama East, North American Datum of 1983 (NAD83) in units of feet. The vertical datum used for the task order was referenced to NAVD 1988, U.S. survey feet, Geoid09.

Figure 1.1 Task Order and LiDAR Flight Layout - Jackson, Marshall, DeKalb Counties, Alabama



SECTION 2: ACQUISITION

The LiDAR data was acquired with a Leica ALS60 200 kHz Multiple Pulses in Air (MPiA) LiDAR sensor system, on board a Cessna 404. The ALS60 LiDAR system, developed by Leica Geosystems of Heerbrugg, Switzerland, includes the simultaneous first, intermediate and last pulse data capture module, the extended altitude range module, and the target signal intensity capture module. The system software is operated on an OC50 Operation Controller aboard the aircraft.

The ALS60 200 kHz Multiple Pulses in Air (MPiA) LiDAR System has the following specifications:

Table 2.1 ALS60 LiDAR System Specifications

Specification	
Operating Altitude	200 - 6,000 meters
Scan Angle	0 to 75° (variable)
Swath Width	0 to 1.5 X altitude (variable)
Scan Frequency	0 - 100 Hz (variable based on scan angle)
Maximum Pulse Rate	200 kHz
Range Resolution	Better than 1 cm
Elevation Accuracy	8 - 24 cm single shot (one standard deviation)
Horizontal Accuracy	7 - 64 cm (one standard deviation)
Number of Returns per Pulse	4 (first, second, third, last)
Number of Intensities	3 (first, second, third)
Intensity Digitization	8 bit intensity + 8 bit AGC (Automatic Gain Control) level
MPiA (Multiple Pulses in Air)	8 bits @ 1nsec interval @ 50kHz
Laser Beam Divergence	0.22 mrad @ 1/e ² (-0.15 mrad @ 1/e)
Laser Classification	Class IV laser product (FDA CFR 21)
Eye Safe Range	400m single shot depending on laser repetition rate
Roll Stabilization	Automatic adaptive, range = 75 degrees minus current FOV
Power Requirements	28 VDC @ 25A
Operating Temperature	0-40°C
Humidity	0-95% non-condensing
Supported GNSS Receivers	Ashtech Z12, Trimble 7400, Novatel Millenium

Prior to mobilizing to the task order site, Woolpert flight crews coordinated with the necessary Air Traffic Control personnel to ensure airspace access.

Woolpert survey crews were onsite, operating a Global Navigation Satellite System (GNSS) Base Station at the Albertville Regional Airport- Thomas J. Brumlik Field (8A0) for the airborne GPS support on days 00412, 00515 and 00612. Coordinates: 34°13'54.73204" (N), 86°14'54.03337" (W), Ellipsoid Height 286.142 meters.

Woolpert survey crews were onsite, operating a Global Navigation Satellite System (GNSS) Base Station at Isbell Field Airport (4A9) for the airborne GPS support on days 01412, 01512, 01812 and 01812. Coordinates: 34°28'24.38814" (N), 85°43'12.22404" (W), Ellipsoid Height 241.011 meters.

Woolpert survey crews were onsite, operating a Global Navigation Satellite System (GNSS) Base Station at Scottsboro Municipal Airport- Word Field (4A6) for the airborne GPS support on days 01512 and 07812. Coordinates: 34°41'14.70066" (N), 86°00'18.68174" (W), Ellipsoid Height 167.757 meters.

The LiDAR data was collected in (9) missions

An initial quality control process was performed immediately on the LiDAR data to review the data coverage, airborne GPS data, and trajectory solution. Any gaps found in the LiDAR data were relayed to the flight crew, and the area was re-flown.

Table 2.2 Airborne LiDAR Acquisition Flight Summary

Airborne LiDAR Acquisition Flight Summary			
Date of Mission	Lines Flown	Mission Time (UTC) Wheels Up/ Wheels Down	Mission Time (Local = EDT) Wheels Up/ Wheels Down
Jan 4, 2012 - S/N 77	1-17	21:45 - 01:21	03:45 PM - 07:21 PM
Jan 5, 2012 - S/N 77	18-40	16:35 - 23:09	10:35 AM - 05:09 PM
Jan 6, 2012 - S/N 77	41-58	16:59 - 21:02	10:59 AM - 03:02 PM
Jan 14, 2012 - S/N 77 A	49, 52, 53, 15-24	17:19 - 20:04	11:19 AM - 04:04 PM
Jan 14, 2012 - S/N 6157 B	33-56	16:06 - 22:52	11:06 AM - 05:52 PM
Jan 15, 2012 - S/N 77 A	1-14, 50-70	15:12 - 21:23	09:12 AM - 03:23 PM
Jan 15, 2012 - S/N 6157 B	25-32. 1-10	13:33 - 21:16	07:33 AM - 03:16 PM
Jan 18, 2012 - S/N 77 A	32-49	21:23 - 03:00	03:23 PM - 09:00 PM
Jan 18, 2012 - S/N 6157 B	11-32	20:50 - 05:25	02:50 PM - 11:25 PM

SECTION 3: LIDAR DATA PROCESSING

APPLICATIONS AND WORK FLOW OVERVIEW

1. Resolved kinematic corrections for three subsystems: inertial measurement unit (IMU), sensor orientation information and airborne GPS data. Developed a blending post-processed aircraft position with attitude data using Kalman filtering technology or the smoothed best estimate trajectory (SBET).
Software: POSPac Software v. 5.3, IPAS Pro v.1.35.
2. Calculated laser point position by associating the SBET position to each laser point return time, scan angle, intensity, etc. Created raw laser point cloud data for the entire survey in .LAS format. Automated line-to-line calibrations were then performed for system attitude parameters (pitch, roll, heading), mirror flex (scale) and GPS/IMU drift.
Software: ALS Post Processing Software v.2.70, Proprietary Software, TerraMatch v. 12.01.
3. Imported processed .LAS point cloud data into the task order tiles. Resulting data were classified as ground and non-ground points with additional filters created to meet the task order classification specifications. Statistical absolute accuracy was assessed via direct comparisons of ground classified points to ground RTK survey data. Based on the statistical analysis, the LiDAR data was then adjusted to reduce the vertical bias when compared to the survey ground control.
Software: TerraScan v.12.005.
4. The .LAS files were evaluated through a series of manual QA/QC steps to eliminate remaining artifacts and small undulations from the ground class.
Software: TerraScan v.12.005.
5. All water bodies greater than two acres and all rivers with a nominal 100 foot width or larger were hydro-flattened using stereo compilation methods.
Software: Summit Evolution v6.4, Microstation v8, TerraScan v.12.005.

GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)-INERTIAL MEASUREMENT UNIT (IMU) TRAJECTORY PROCESSING

EQUIPMENT

Flight navigation during the LiDAR data acquisition mission is performed using IGI CCNS (Computer Controlled Navigation System). The pilots are skilled at maintaining their planned trajectory, while holding the aircraft steady and level. If atmospheric conditions are such that the trajectory, ground speed, roll, pitch and/or heading cannot be properly maintained, the mission is aborted until suitable conditions occur.

The aircraft are all configured with a NovAtel Millennium 12-channel, L1/L2 dual frequency Global Navigation Satellite System (GNSS) receivers collecting at 2 Hz.

All Woolpert aerial sensors are equipped with a Litton LN200 series Inertial Measurement Unit (IMU) operating at 200 Hz.

A base-station unit was mobilized for each acquisition mission, and was operated by a member of the Woolpert survey crew. Each base-station setup consisted of one Trimble 4000 - 5000 series dual frequency receiver, one Trimble Compact L1/L2 dual frequency antenna, one 2-meter fixed-height tripod, and essential battery power and cabling. Ground planes were used on the base-station antennas. Data was collected at 1 or 2 Hz.

Woolpert survey crews were onsite, operating a Global Navigation Satellite System (GNSS) Base Station at the Albertville Regional Airport- Thomas J. Brumlik Field (8A0), Isbell Field Airport (4A9) and Scottsboro Municipal Airport- Word Field (4A6) for airborne GPS support.

The GNSS base stations operated during the LiDAR acquisition missions are listed below:

Table 3.1: GNSS Base Stations

Station	Latitude	Longitude	Ellipsoid Height (L1 Phase Center)
Name	(DMS)	(DMS)	(Meters)
8A0	N 34° 13' 54.73	W 86° 14' 54.03	286.142
4A9	N 34° 28' 24.38	W 85° 43' 12.22	241.011
4A6	N 34° 41' 14.70	W 86° 00' 18.68	167.757

DATA PROCESSING

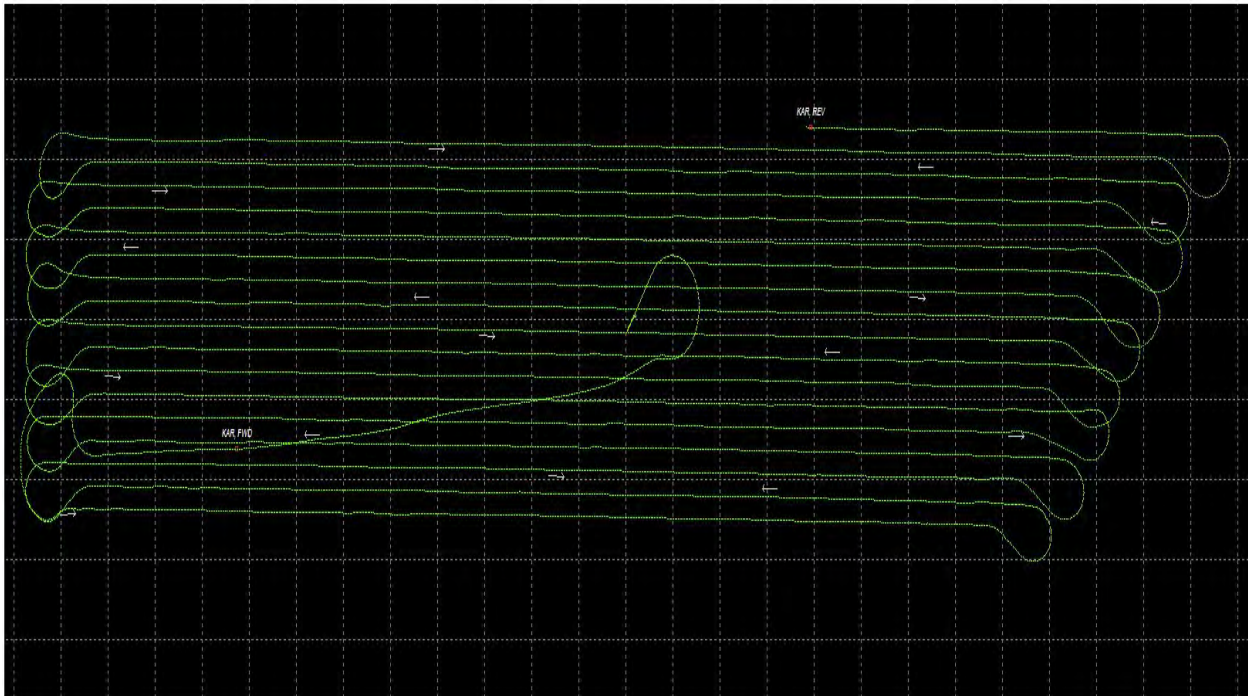
All airborne GNSS and IMU data was post-processed and quality controlled using Applanix 5.3 MMS software. GNSS data was processed at a 1 and 2 Hz data capture rate and the IMU data was processed at 200 Hz.

TRAJECTORY QUALITY

The GNSS Trajectory, along with high quality IMU data are key factors in determining the overall positional accuracy of the final sensor data. See Figure 3.1 for the flight trajectory.

Flight Trajectory

Figure 3.1: Representative Graph from Day 01812



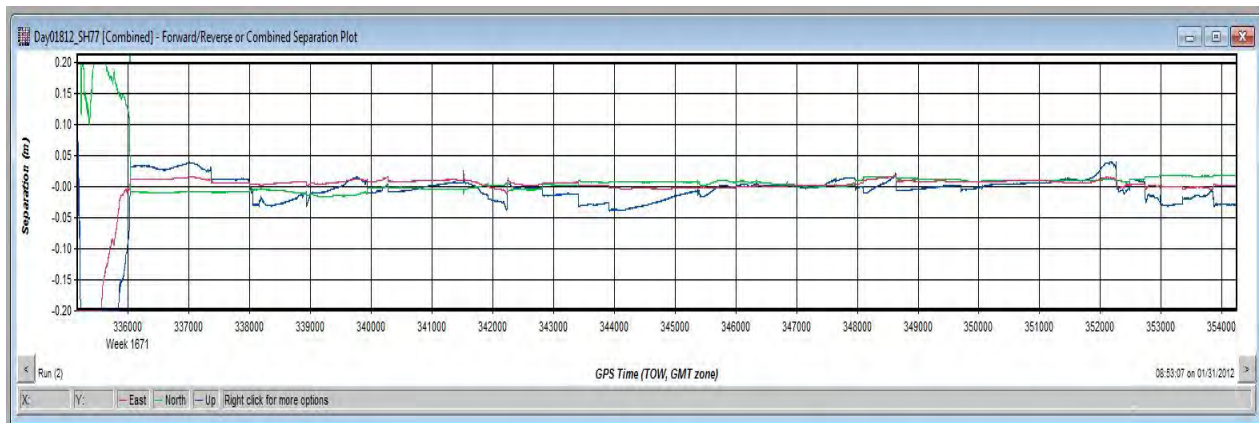
Within the trajectory processing, there are many factors that affect the overall quality, but the most indicative are the Combined Separation, the Estimated Positional Accuracy, and the Positional Dilution of Precision (PDOP).

Combined Separation

The Combined Separation is a measure of the difference between the forward run and the backward run solution of the trajectory. The Kalman filter is processed in both directions to remove the combined directional anomalies. In general, when these two solutions match closely, an optimally accurate reliable solution is achieved.

Woolpert's goal is to maintain a Combined Separation Difference of less than ten (10) centimeters. In most cases we achieve results below this threshold. See Figure 3.2 for the combined separation graph.

Figure 3.2: Representative Graph from Day 01812 of Combined Separation

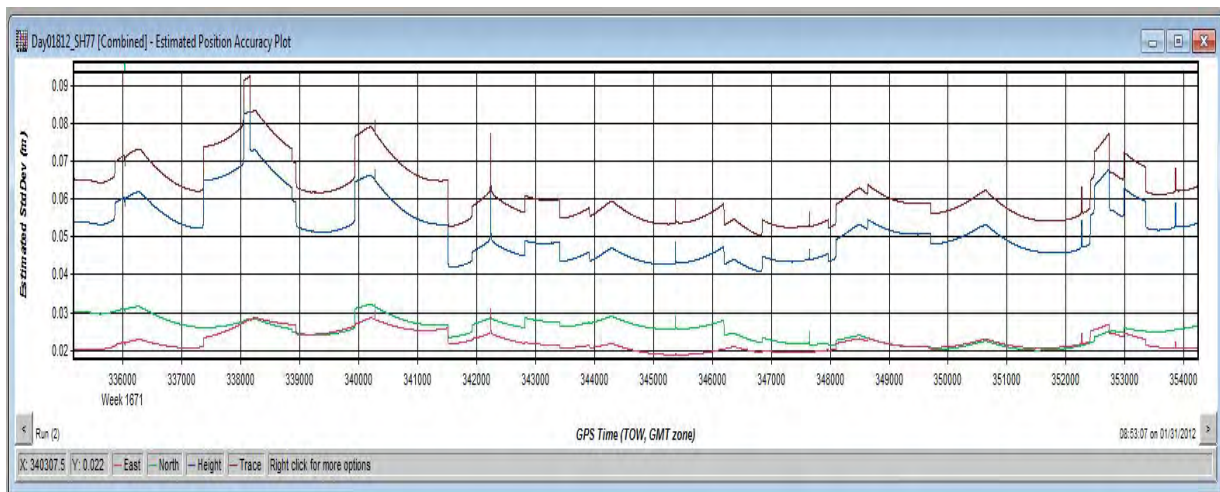


Estimated Positional Accuracy

The Estimated Positional Accuracy plots the standard deviations of the east, north, and vertical directions along a time scale of the trajectory. It illustrates loss of satellite lock issues, as well as issues arising from long baselines, noise, and/or other atmospheric interference.

Woolpert's goal is to maintain an Estimated Positional Accuracy of less than ten (10) centimeters, often achieving results well below this threshold.

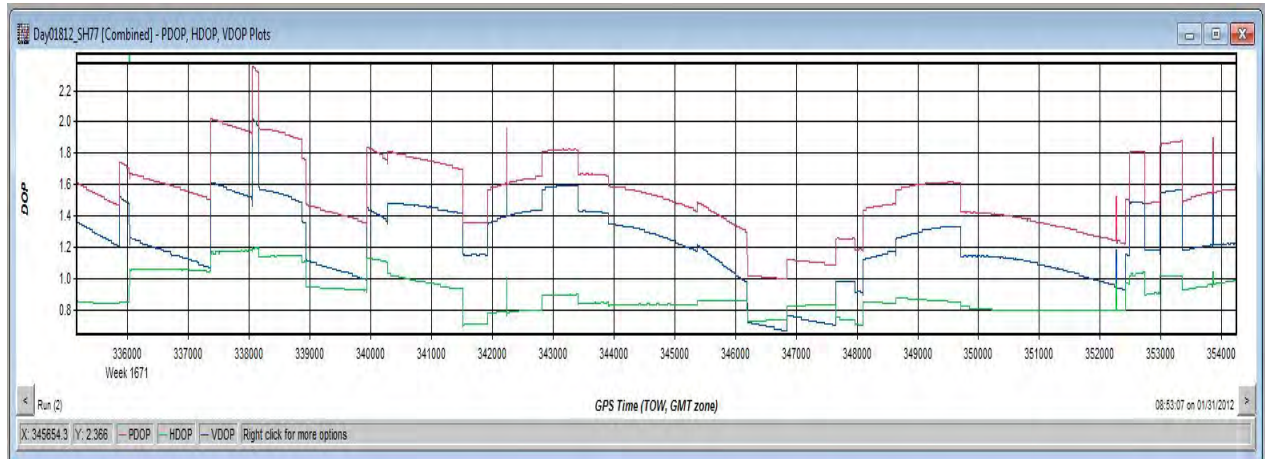
Figure 3.3: Representative Graph from Day 01812 of Positional Accuracy



PDOP

Position Dilution of precision (DOP) is a measure of the quality of the GPS data being received from the satellites. Woolpert's goal is to maintain an average PDOP of 3 or less.

Figure 3.4: Representative Graph from Day 01812 of PDOP



LIDAR DATA PROCESSING

When the sensor calibration, data acquisition, and GPS processing phases were complete, the formal data reduction processes by Woolpert LiDAR specialists included:

- Processed individual flight lines to derive a raw "Point Cloud" LAS file. Matched overlapping flight lines, generated statistics for evaluation comparisons, and made the necessary adjustments to remove any residual systematic error.
- Calibrated LAS files were imported into the task order tiles and initially filtered to create a ground and non-ground class. Then additional classes were filtered as necessary to meet client specified classes.
- Once all of the task order data was imported and classified, cross flights and survey ground control data was imported and calculated for an accuracy assessment. As a QA/QC measure, Woolpert has developed a routine to generate accuracy statistical reports by comparison among LiDAR points, ground control, and TINs. The LiDAR is adjusted accordingly to reduce any vertical bias to meet or exceed the vertical accuracy requirements.
- The LiDAR tiles were reviewed using a series of proprietary QA/QC procedures to ensure it fulfills the task order requirements. A portion of this requires a manual step to ensure anomalies have been removed from the ground class.
- The bare earth DEM surface was hydrologically flattened for waterbody features that were greater than 2 acres and rivers and streams of 100 feet and greater nominal width.
- The LiDAR LAS files for this task order have been classified into the Default (Class 1), Ground (Class 2), Noise (Class 7), Water (Class 9), Breakline Buffer (class 10) and Overlap (Class 12)

classifications.

- FGDC Compliant metadata was developed for the task order in .xml format for the final data products.
- The horizontal datum used for the task order was referenced to State Plane Alabama East, North American Datum of 1983. Coordinate positions were specified in units of feet for the Alabama project. The vertical datum used for the task order was referenced to NAVD 1988, U.S. survey feet, Geoid09.

SECTION 4: HYDROLOGIC FLATTENING AND FINAL QUALITY CONTROL

HYDROLOGIC FLATTENING OF LIDAR DEM DATA

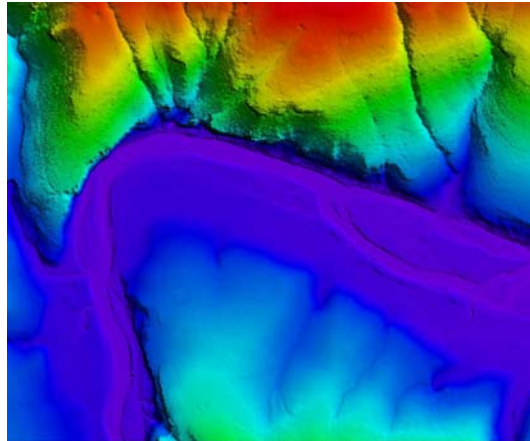
This task required the compilation of breaklines defining water bodies and rivers. The breaklines were used to perform the hydrologic flattening of water bodies, and gradient hydrologic flattening of double line streams and rivers. Lakes, reservoirs and ponds, at a minimum size of 2-acres or greater, were compiled as closed polygons. The closed water bodies were collected at a constant elevation. Rivers and streams, at a nominal minimum width of 100 feet (30.5 meters), were compiled in the direction of flow with both sides of the stream maintaining an equal gradient elevation.

LIDAR DATA REVIEW AND PROCESSING

Woolpert utilized the following steps to hydrologically flatten the water bodies and for gradient hydrologic flattening of the double line streams within the existing LiDAR data.

1. Woolpert used the ADS stereo imagery in combination with contours generated from the LiDAR acquired to analyze the water needed to be collected.
2. To make sure that the water was compiled correctly, we used contours generated from the raw LiDAR, using Terrascan and Terramodeler, to assist with the determination of the elevation of the water in combination with the stereo imagery, using Summit Evolution v6.4 and Microstation V8. This is to help determine the elevation of the water and help with the horizontal placement of the line. (Vegetation could be obscuring)
3. The stereo compilers collected any Lakes, reservoirs or ponds of a minimum size of 2-acres or greater, as closed polygons at a constant elevation. Rivers and streams, at a nominal minimum width of 100 feet (30.5 meters), were compiled in the direction of flow with both sides of the stream maintaining an equal gradient elevation.
4. 4. In addition to the water collection, 2' contours were generated from the ground points of the LiDAR. Breaklines were supplemented to enforce the contour accuracy. All waterlines and breaklines were included in the final contour generation.

Figure 4.1



5. All ground points were reclassified from inside the hydrologic feature polygons to water, class nine (9).
6. All ground points were reclassified from within a 5 foot (1.5 meter) buffer along the hydrologic feature breaklines to buffered ground, class ten (10).
7. The LiDAR ground points and hydrologic feature breaklines were used to generate a new digital elevation model (DEM).

Figure 4.2



Figure 4.3



Figure 4.2 reflects a DEM generated from original LiDAR bare earth point data prior to the hydrologic flattening process. Note the "tinning" across the lake surface.

Figure 4.3 reflects a DEM generated from LiDAR with breaklines compiled to define the hydrologic features. This figure illustrates the results of adding the breaklines to hydrologically flatten the DEM data. Note the smooth appearance of the lake surface in the DEM.

Terrascan was used to add the hydrologic breakline vertices and export the lattice models. The

hydrologically flattened DEM data was provided to USGS in .img format at a 4-foot cell size. The hydrologic breaklines compiled as part of the flattening process were provided to the USACE as an ESRI shapefile. The breaklines defining the water bodies greater than 2-acres were provided as a PolygonZ file. The breaklines compiled for the gradient flattening of all rivers and streams at a nominal minimum width of 100-feet were provided as a PolylineZ file.

DATA QA/QC

Initial QA/QC for this task order was performed in Global Mapper v11, by reviewing the grids and hydrologic breakline features.

Edits and corrections were addressed individually by tile. If a water body breakline needed to be adjusted to improve the flattening of the ArcGRID DEM, the area was cross referenced by tile number, corrected accordingly, a new ArcGRID DEM was regenerated and then reviewed in Global Mapper.

SECTION 5: FINAL ACCURACY ASSESSMENT

FINAL VERTICAL ACCURACY ASSESSMENT

The vertical accuracy statistics were calculated by comparison of the LiDAR bare earth points to the ground surveyed QA/QC points.

Table 5.1: Overall Vertical Accuracy Statistics the Alabama Project

Average error	+0.020	Survey Feet
Minimum error	-0.261	Survey Feet
Maximum error	+0.330	Survey Feet
Average magnitude	0.155	Survey Feet
Root mean square	0.185	Survey Feet
Standard deviation	0.188	Survey Feet


Table 5.2: QA/QC Analysis, State Plane Alabama East, NAD83, Alabama Project

Point ID	Easting (UTM survey feet)	Northing (UTM survey feet)	Elevation (survey feet)	Laser Elevation (survey feet)	Dz (survey feet)
1001	541671.085	1604098.022	671.464	671.41	-0.054
1002	692029.971	1618125.02	661.737	661.72	-0.017
1003	726942.837	1582206.43	1382.377	1382.41	0.033
1004	741418.306	1476919.515	1652.095	1651.85	-0.245
1005	574685.459	1348226.932	1065.583	1065.73	0.147
1007	433381.872	1388370.207	1082.993	1083.24	0.247
1009	6186472	1534884.338	634.961	635.16	0.199
1013	736307.146	1526721.904	877.967	877.99	0.023
1014	555836.872	1491953.805	1323.82	1323.88	0.06

Point ID	Easting (UTM survey feet)	Northing (UTM survey feet)	Elevation (survey feet)	Laser Elevation (survey feet)	Dz (survey feet)
1015	500716.46	1332358.001	916.395	916.42	0.025
1004_RTK	741418.156	1476919.533	1652.045	1651.84	-0.205
1006A	579304.759	1435195.912	1149.878	1150	0.122
1006B	579331.982	1435051.407	1158.583	1158.72	0.137
1008A	523909.749	1489653.278	618.119	617.87	-0.249
1008B	523937.838	1489663.941	618.54	618.28	-0.26
1010A	676497.308	1371929.822	1141.899	1141.77	-0.129
1010B	676541.276	1371906.19	1140.138	1140.01	-0.128
1011A	675304.332	1505415.503	1454.11	1454.35	0.24
1011B	674915.868	1505256.4	1456.79	1457.12	0.33
1012A	441492.588	1465635.134	568.591	568.91	0.319
1012B	439886.81	1467453.643	563.07	563.2	0.13
1012C	442860.323	1452269.457	601.978	601.97	-0.008
1015_B	502553.992	1333578.276	920.571	920.31	-0.261

VERTICAL ACCURACY CONCLUSIONS

Tested 0.36 feet fundamental vertical accuracy at 95 percent confidence level in open terrain using RMSE (z) x 1.9600. Based on the analysis of the LiDAR data, the accuracy of the data meets the task order requirements.

Approved By:			
Title	Name	Signature	Date
Associate LiDAR Specialist Certified Photogrammetrist #1281	Qian Xiao		August 14, 2012

SECTION 6: FINAL DELIVERABLES

FINAL DELIVERABLES

The final LiDAR deliverables are listed below.

- LAS v1.2 classified point cloud.
- LAS v1.2 raw unclassified point cloud flight line strips no greater than 2GB. Long swaths greater than 2GB will be split into segments)
- Hydrologically flattened Polygon z and Polyline z shapefiles in GDB
- Hydrologically flattened bare earth 4-ft DEM in IMG format
- Tile Layout and data extent provided as ESRI shapefile
- Control points provided as ESRI shapefile
- FGDC compliant metadata by product in XML format
- LiDAR and Survey processing report in pdf format